

**A SHORT PRACTICE
OF GYNÆCOLOGY**

ALSO BY DR. JELLETT

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The glands and lymphatics connected with the pelvis. (Modified from Döderlein.)

A SHORT PRACTICE OF GYNÆCOLOGY

FOR MEDICAL STUDENTS

BY

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Physicians, Ireland

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PREFACE.

THIS book represents a simplified and shortened edition of my "Practice of Gynæcology," which has just been published, and which in turn represents the Fourth Edition of my "Short Practice of Gynæcology." It is intended for the use of students by whom the larger book may be found too full.

I have divided it into two parts. Part I. deals with Gynæcological Diseases and their Treatment, and with minor Gynæcological Operations. It contains, I think, all that a student can be expected to know. Part II. deals with certain major Gynæcological Operations, and has been added to enable the student to follow and understand these operations, when he sees them performed in the operating theatre.

I hope the book may be found useful by those for whom it is intended.

HENRY JELLETT.

FURNES,

BELGIUM.

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PART I.
GYNÆCOLOGICAL DISEASES AND
THEIR TREATMENT,
INCLUDING MINOR GYNÆCOLOGICAL OPERATIONS.

A SHORT PRACTICE OF GYNÆCOLOGY.

PART I.

CHAPTER I.

THE DIAGNOSIS OF GYNÆCOLOGICAL CASES.

The History of the Patient—Physical Examination : Pelvic Examination, Bimanual Examination, Combined Rectal and Vaginal Examination : Abdominal Examination—Diagnostic Instruments : Speculum, Tenaculum, Sound, Curette, Cervical Dilators, Microscope—Diagnostic Operations—Importance of Early Diagnosis.

A DIAGNOSIS is reached in gynæcological cases first by ascertaining the history of the patient, and then by making a careful and complete physical examination. The relative value of the information obtained respectively by these two methods differs in different cases. The history of the patient is always of importance, inasmuch as it tells us of what she is complaining, that is what her subjective symptoms are, but it is seldom that an accurate diagnosis can be made from it. Gynæcological conditions, differing widely in pathology and in clinical importance, tend to cause symptoms which are identical in general character, which differ only to a small extent in degree, and which consequently will not form a sound basis for accurate diagnosis. The physical examination, on the other hand, if thoroughly and systematically carried out, is of extreme importance, and enables the cause of the particular group of symptoms to be discovered.

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I. THE HISTORY OF THE PATIENT.—In eliciting the history of the patient the following are the principal points on which information must be obtained :—

(1) Her Age.—The life of a woman can be divided into certain periods which have an important bearing on her symptoms and physical condition, and on gynæcological treatment. These periods are as follows :—

•
•
(a) Infancy and childhood. This period lasts from birth to puberty, and during it the sexual organs are dormant, so that, so far as they are concerned, the child is asexual.

(b) Puberty. Puberty is the term applied to the beginning of the sexual life of the woman. The age at which it occurs differs considerably in different countries, and is affected by climate,

mode of life, and race. As a general rule, it occurs earlier in hot countries, and later in cold countries; earlier in girls who live in a city or in affluent circumstances, later in those who live in the country or in poor circumstances; earlier in the Latin races later in the Anglo-Saxon. In these countries, puberty usually occurs between the ages of thirteen and sixteen. Its onset is characterised by a rapid development of the breasts and genital organs by the occurrence of menstruation, by changes in the outline of the figure due to the increased deposit of fat, and by alterations in the habits and inclinations.

(c) Nubility. Nubility is the term applied to the period of sexual activity during which childbirth may occur. It lasts from puberty to the menopause. The first few years of this period are characterised by progressive development of the sexual organs, the last year or two by gradual retrograde changes which take place in them, and the intervening years by full activity.

(d) Menopause. The menopause is the term applied to the period of cessation of menstruation and sexual activity. The exact age at which it occurs varies in different women within considerable limits. As a rule it comes on between forty-five and fifty, while the average age is said to be forty-seven, i.e., thirty-three years after puberty. It is characterised by the cessation of menstruation, by the gradual loss of the sexual appetite, and, in some women, by slight nervous disturbances.

(e) Post-climacteric period. This is the concluding period of a woman's life, and extends from the menopause to death. It is characterised by atrophy of the genital organs.

(2) Is she single, married, or a widow?—If married, for how long? If a widow, for how long was she married, and for how long is she a widow? The state of life of a woman is important as showing that she is, or is not, exposed to some of the causes of genital disease. For a similar reason, if she is married, one must ascertain if she lives with her husband, and, if not, how long an interval has elapsed since she last did so.

(3) Number and Nature of Pregnancies.—In addition to ascertaining the number of pregnancies, information must be obtained regarding their nature and the nature of the respective labours. With this object, the following points must be ascertained :—

(a) Duration of pregnancies, i.e., number of abortions, immature or premature births, and full-term labours.

(b) Nature of labours, i.e., normal, prolonged, or instrumental; nature of complications, if any.

- (c) Nature of the puerperium, i.e., a rapid convalescence and a complete recovery, or a protracted convalescence; if the latter, the cause of protraction.
- (d) Time since the birth of the last child. If pregnant at present, for how long?
- (4) Menstrual History.—The menstrual history is a most important part of the information afforded by the patient. Information on the following points should be elicited :—
 - (a) The age at which menstruation began.
 - (b) The usual interval between the periods, and the occurrence of any variations in it. The usual interval is about twenty-four days from the end of one period to the beginning of the next.
 - (c) Amount of discharge, whether normal, excessive (menorrhagia), scanty, or absent (amenorrhœa). It is often difficult to determine with any exactness what a woman means by saying that the discharge is natural, excessive, or slight in amount. Every woman is more or less a rule to herself, and usually when she says that the loss at a period was natural, excessive (menorrhagia), or slight in amount, she means that the amount was the same as, was greater than, or was less than, it habitually is. Some more definite idea of the amount of the discharge may be obtained by inquiring into the number of napkins used daily during the period, and the extent to which each was soiled. The average amount of discharge is from four to six ounces.
 - (d) The usual duration of the period. The duration of the period varies considerably in different women, even in perfect health. The usual duration is from four to five days.
 - (e) The occurrence of pain. A varying degree of discomfort or even actual pain (dysmenorrhœa) occurs in a considerable proportion of women, who otherwise appear to menstruate normally and are apparently in perfect health. Pain, however, must be regarded as pathological when it is sufficient to interfere with the avocations of the woman or with her general health.
 - (f) The passage of clots. Normal menstrual discharge should not contain clots. Their presence is always pathological.
 - (g) The occurrence of a discharge of blood between the periods. This never occurs in health; it is a symptom of many of the graver forms of uterine disease, and is known as metrorrhagia.
 - (h) The date of last menstruation. This is of considerable importance, as it points to, or excludes, the probability of pregnancy.

(5) *The Presence of Vaginal Discharge.*—The presence of a white or yellow vaginal discharge (leucorrhœa) is a symptom common to many forms of vaginal and uterine disease. It usually is mucoid or muco-purulent in character, but in some cases is watery or contains blood.

(6) *The Existence of Pain.*—The occurrence of pain, apart from that limited to the menstrual period, must be ascertained, and also its site, degree of intensity, whether continuous or intermittent, and, if intermittent, when and how often it occurs.

(7) *The General Health.*—In addition to determining the presence of special symptoms—the result of genital disease, the presence of any symptoms suggestive of disease of any other part of the body, such as of the cardiac, respiratory, digestive, and urinary systems, must also be ascertained.

II. THE PHYSICAL EXAMINATION.—The information obtained from the physical examination of the patient is even more important than that obtained from her history. The latter tells the symptoms of which the patient requires to be cured, and in most cases furnishes at least a clue to the nature of the case; but for the exact diagnosis of the condition of affairs present one must rely chiefly on the physical examination. The physical examination may be placed under two heads:—

(1) Abdominal examination.

(2) Pelvic examination.

(1) *Abdominal Examination.*—If we exclude the examination of organs other than pelvic, abdominal examination is only of use in gynæcological cases when the abdomen is occupied by a tumour which has risen above the pelvic brim, or when the abdomen is distended by fluid. In such cases we can obtain by its means, first, a diagnosis between a tumour and ascites, and secondly, if the presence of a tumour is determined, some information with regard to its size, consistency, outline, and connections with the other abdominal contents. Abdominal examination is of special assistance in distinguishing between large uterine or ovarian tumours and a pregnant uterus, an enlarged kidney or spleen, or other tumour of the abdominal as opposed to the pelvic viscera.

(2) *Pelvic Examination.*—A thorough pelvic examination is essential in all gynæcological cases, and, in order to carry it out satisfactorily, the patient must lie in the dorsal position on a suitable couch, and the abdominal walls must be relaxed. If it is impossible to procure sufficient relaxation without an anæsthetic, the latter must be administered. In all cases the bladder, and, if possible, the intestines, must be empty. Until recently, the most suitable gynæcological couch

was the "Veit-Schroeder," or some modification of it (*v.* Fig. 1), but now numerous forms of metal gynæcological "tables" or "chairs" are made, most of which are very suitable for their purpose. If, however, a special couch is not available, a satisfactory pelvic examination can be made while the patient lies on her back on a low couch or bed with her thorax slightly raised and her knees drawn up, so as to obtain the maximum relaxation of the abdominal wall.

Vaginal examination alone is not of such importance in gynæcological as in obstetrical work. By its means the condition of the perinæum, of the vagina, and of the cervix can be determined, but beyond this little information is obtainable.

The mode of examination on which we almost entirely rely for pelvic information is "bimanual examination." This is carried out as

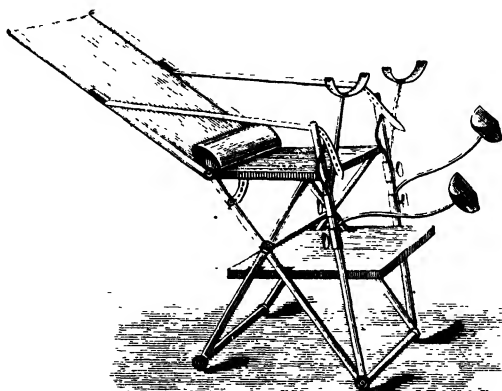


FIG. 1.—Veit-Schroeder gynæcological couch.

follows :—Place the patient on a gynæcological couch, if one is available, her knees flexed over the knee rests, and her buttocks at the front edge of the seat, and then stand between the knees with the right foot upon the stool of the couch. Having ascertained that the bladder is empty, introduce the index finger of the right hand into the vagina, keeping it pressed against the perinæum, and pass it upwards into the anterior fornix. At the same time the elbow must rest upon the right knee, in order that the weight of the arm may be supported. The fingers of the left hand are then laid flat upon the abdominal wall in the middle line, the tips reaching halfway up to the umbilicus. The tips of the fingers are pressed backwards in the direction of the promontory of the sacrum, in such a manner that the fingers roof over, as it were, the pelvic cavity. Now, by endeavouring to approximate these with the finger in the vagina, we can feel that something lies between them (*v.* Fig. 2). By gently rotating the external fingers, we are able to map

out the outlines of the intervening object, and to determine in a normal case that it is the uterus. If the finger in the vagina is not of sufficient length, by inserting the middle finger also we are enabled to reach some half an inch higher. If we approximate the fingers without finding any resisting body between them, we should withdraw the vaginal fingers from the anterior fornix and place them directly under the cervix,



FIG. 2.—Method of making a bimanual examination.

Then, by pushing the cervix upwards in the direction of the external fingers, the entire uterus, if it is in front, is lifted up towards the abdominal wall, and is more easily felt. If the uterus is lying posteriorly, the cervix, and its junction with the body, alone are felt. Next, the vaginal fingers are passed into the posterior fornix, and, using the external fingers as before, the contents of Douglas' pouch are examined. In order to palpate the ovaries, the vaginal fingers are placed in one or other lateral fornix, and approximated to the external fingers. If the

ovary is not at once felt between them, both hands are drawn slowly and gently downwards towards the anterior wall of the pelvis and



FIG. 3.—The external genitals in a virgin. L.Ma. Labium majus. L.Mi. Labium minus. C. Clitoris. U. Urethral orifice. H. Hymen. V. Vaginal orifice. F. Posterior fourchette. P. Perineum.

parallel with the conjugate diameter of the brim. The ovary of the same side will then be felt to slip between the fingers. The opposite ovary can be felt by examining at the opposite side in a similar manner. If the ovaries are not felt at first, the fingers should be again drawn

down as before, but keeping closer to the pelvic brim or to the uterus, so as to travel over fresh ground. It is usually considered best to examine the right adnexa with the fingers of the right hand in the vagina, and the left adnexa with the fingers of the opposite hand. The

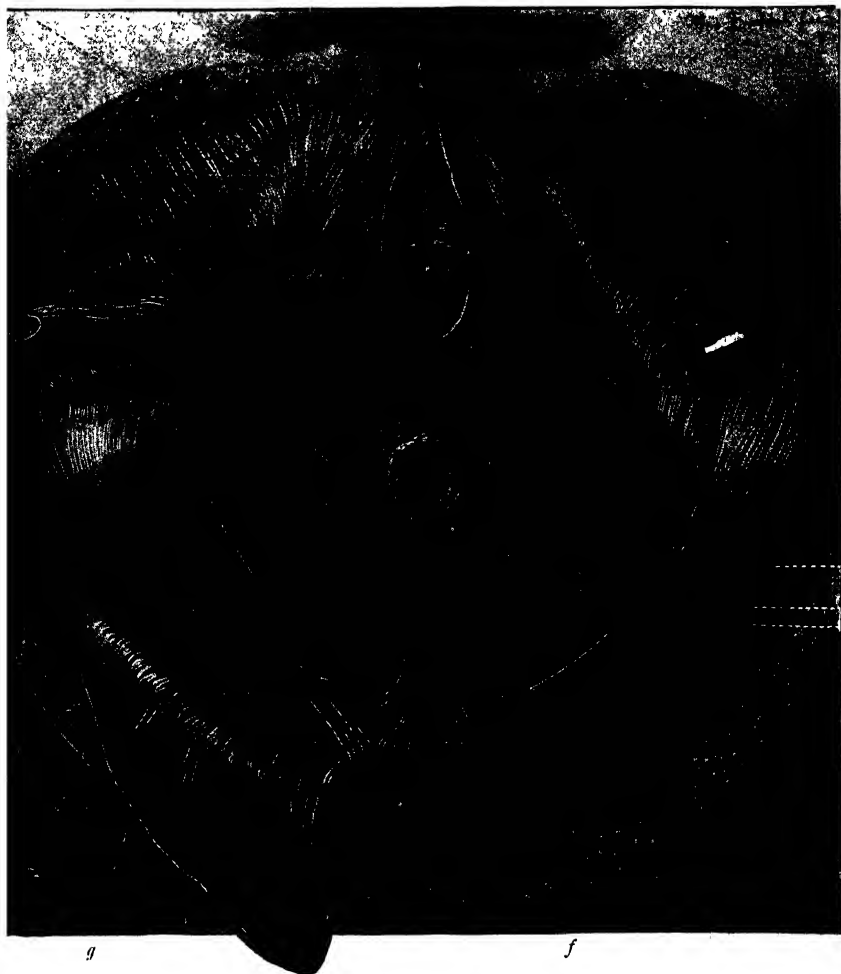


FIG. 4.—The muscles of the pelvic floor as seen from below. (*Kelly.*)

great essentials necessary to make a successful bimanual examination are to induce the patient to relax the abdominal muscles or to obtain relaxation by anaesthesia, to be sure that the bladder and intestines are empty, and to make all movements with extreme gentleness, avoiding as far as possible any unnecessary movements of the vaginal fingers.

A modification of this method of examination, and one which often enables us to obtain more information, is to make the examination as an abdomino-vagino-rectal examination instead of as an abdomino-vaginal examination. This is carried out in the same manner as the previous method, with the exception that the middle finger of the right



FIG. 5.—Sagittal section through adult body, showing the normal position and relations of the uterus, bladder, rectum, and abdominal walls. The intestines are not shown, and the dotted line represents the outline of the pelvic bones. Note the proximity of the anterior abdominal wall to the sacral promontory. (Kelly.)

hand is passed into the rectum, the index finger being kept in the vagina. In this way it is possible to tell not only what lies between the roof of the vagina and the abdominal wall, but also at the same time what lies between the vagina and the rectum.

It must not be forgotten that, in addition to the abdominal and pelvic examination, a thorough physical examination must be made in

all cases with a view to determining the condition of the cardiac, respiratory, urinary, and digestive organs

The latero-prone position, also known as Marion Sims' position, as he was the first to describe it, is still used by some gynæcologists, both for the purpose of making a pelvic examination and for performing



FIG. 6.—The relations of the pelvic viscera as seen from above (Kelly)

certain vaginal operations. We do not recommend it, and so do not describe it.

Diagnostic Instruments.—Among the more important instruments which are used for diagnostic purposes are the following :—

Speculum.—A suitable speculum is necessary in order to ascertain the condition of the vaginal or cervical mucous membrane. The most serviceable form for this purpose is Fergusson's cylindrical speculum or some modification of it (v. Fig. 7). It must be made of metal or of porcelain, to enable it to be sterilised by boiling. Another form, which is sometimes more easily used as it is self-retaining, is Nott's trivalve speculum (v. Fig. 8). This is composed of three blades, which approxi-

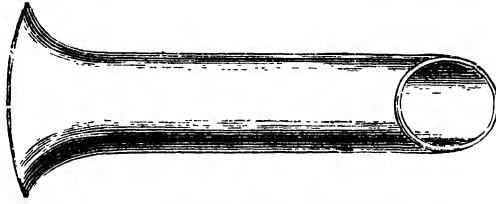


FIG. 7.—Cylindrical speculum made in metal after Fergusson's model.

mately form arcs of the same circle. It is inserted with the three blades in apposition with one another, and, when in position in the vagina, these are made to diverge eccentrically by means of a screw. A long posterior speculum may also be used, but, if so, it will be necessary to catch and draw down the cervix with a volsellum in order to expose it sufficiently.

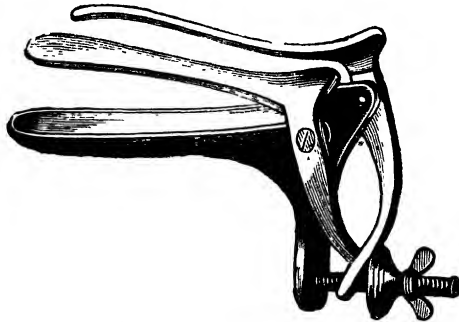


FIG. 8.—Nott's trivalve speculum, almost $\frac{1}{2}$ scale.

Volsellum.—The most generally used form of volsellum is that known as an American bullet forceps (v. Fig. 9). Such an instrument is required for fixing the cervix or drawing it down into view.

Sound.—A uterine sound is of use for ascertaining the position of the uterus when it is impossible to do so by a bimanual examination. It is also used for ascertaining the length and size of the uterine cavity, the presence of an abnormal formation of the uterus—as double uterus or the like, and the existence and outline of intra-uterine tumours. The

sound, like many other things, has fallen into a certain amount of disrepute owing to its too frequent and too incautious use in the past. When it is introduced through a septic vagina into the uterine cavity, it is undoubtedly a dangerous instrument. It must be remembered that, if it is to be used with safety, the vagina must first be thoroughly douched and disinfected, or else the sound must be passed through the latter in such a manner that it does not come in contact with the mucous membrane.

Curette.—A curette is a serviceable instrument for ascertaining the nature of obscure conditions of the uterine mucous membrane, inasmuch as it enables us to bring away a small portion of the latter, which can then be examined under the microscope. By its timely use in cases of uterine hæmorrhage, malignant disease can be recognised in its early stage, and thus the most favourable chance given for successful operative interference.

Cervical Dilators.—Cervical dilators of some form are required in almost all cases in which it is considered necessary to remove with the

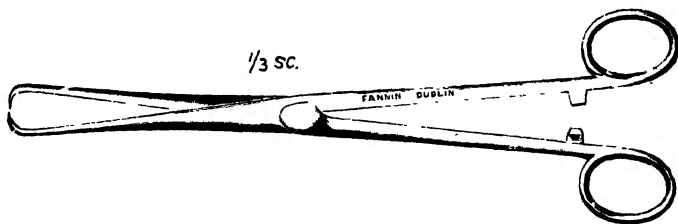


FIG. 9.—American bullet forceps.

curette a portion of the mucous membrane for examination, or to pass the finger into the uterus in order to ascertain the nature of the contents. They may be divided into two classes—those which act slowly, and those which act rapidly.

In the first class come the so-called “tents” and hydrostatic dilators. A tent is the name applied to a group of cylindrical rods of different sizes made from various absorbent substances, which tend to increase in size as they imbibe moisture. The commonest, and the safest to use, as they can be most easily sterilised, are made from sea-tangle (*Laminaria digitata*). These are sterilised by prolonged immersion in absolute alcohol and corrosive sublimate (one per cent. solution), or by boiling in super-heated alcohol in the author’s catgut steriliser. They are passed into the cervix, taking care that they traverse the internal os. The number used depends upon their size and upon the initial capacity of the cervical canal. It is better to use a number of small tents than one or two large ones, and as a rule as many are inserted as the cervix will hold without any forcing. They produce their maximum amount of dilatation within twelve to twenty-four hours, and, if a further

amount of dilatation is required, the first set is removed and a larger number inserted. Tupelo-wood tents are sometimes used as a substitute for laminaria. They can be obtained of a larger size than can the latter, and are said to expand more uniformly. They are sterilised as described above. Hydrostatic dilators—of which Barnes' bag is an example—are very rarely used in gynæcological practice. A third method of gradual dilatation, but one which is very much slower than the foregoing, is the introduction of a succession of firm tamponades of iodoform gauze into the uterine and cervical cavities. Each tamponade is left in for from twenty-four to forty-eight hours, and the process usually requires to be repeated some six or eight times in order to obtain sufficient dilatation. During this process, it is not necessary to confine the patient to bed, as is the case when tents are used, and this in itself is sometimes of advantage.

In the second class of cervical dilators are included Hegar's dilators

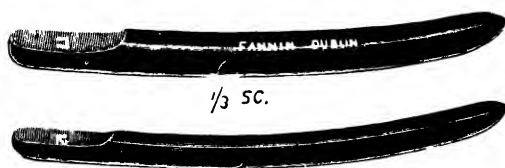


FIG. 10.—Hegar's dilators.

and their various modifications. Hegar's dilators are usually made of metal, in twenty-six sizes (*v.* Fig. 10). They are graduated from No. 1, which is about the size of a coarse knitting-needle, up to No. 26, and the numbers correspond to their diameter in millimetres. In order to introduce them, the cervix is exposed by passing a posterior speculum, and is seized in a bullet forceps and drawn down. Then, after ascertaining the direction of the cervical canal by means of a sound, the largest dilator which the cervix will admit is introduced. This is followed after a few seconds' interval by the next in size, and so on until the required degree of dilatation is obtained. These dilators furnish the most satisfactory means of obtaining the degree of dilatation necessary for curetting, *i.e.*, about up to No. 10; after this, however, they tend to tear the cervix unless it is unusually dilatable. The method of carrying out dilatation will be described later.

The Microscope.—It is impossible to deal here with the use of the microscope for diagnostic purposes, and it is only necessary to call attention to the necessity for microscopical examination in diagnosing malignant disease in its early stages, and tuberculous disease at almost any stage.

Diagnostic Operations.—In some cases of obscure intra-peritoneal disease, the only method of making a diagnosis is by means of a coeliotomy, *i.e.*, the opening of the abdominal cavity. Such a coeliotomy may be performed through the abdominal wall or through the vagina.

The digital or instrumental exploration of the uterine cavity, the removal of the endometrium or of a portion of some cervical or vaginal tumour for microscopical examination, and the digital or ocular examination of the bladder, must also be included under this heading as minor diagnostic operations.

Before leaving the subject of diagnosis, we should like to insist on the necessity of making an accurate diagnosis in all cases of uterine hæmorrhage and of abdominal tumours at the earliest possible moment. Nothing has contributed so much to the comparative failure of the operative treatment of malignant disease in the past as the neglect of this precaution.

CHAPTER II.

MENSTRUATION AND ITS DISORDERS.

Menstruation : Theories concerning—Amenorrhœa : Apparent, Actual—Menorrhagia and Metrorrhagia—Dysmenorrhœa—Leucorrhœa.

MENSTRUATION.

MENSTRUATION (*menstrualis*, monthly) is the term applied to the periodical escape of blood from the uterus, which escape takes place physiologically every fourth week from puberty to the menopause, except during pregnancy and lactation. In these countries, puberty, as a rule, occurs between the ages of thirteen and sixteen. In hot countries, on the other hand, it comes on at an earlier, and in cold countries at a later date. The menopause usually comes on about thirty-three years after puberty, that is some time between forty-five and fifty. The menstrual discharge consists at first of mucus from the uterine and cervical glands, and then of venous blood which normally does not clot. This absence of clotting is attributed variously to mixture with the acid vaginal discharge, and to the presence of trypsin which digests the fibrin and so leaves the blood defibrinated. There are also in the menstrual discharge fragments of endometrium which are undergoing degeneration. The discharge varies in amount from four to six ounces, and it continues normally from four to five days. In the amount of the discharge and the attendant symptoms, the duration of the period and the interval between the periods, every woman is a law to herself. The physical and mental effects of normal menstruation on the woman have been the subject of much discussion, and it is generally considered that slight pain, and some general disturbance as shown by headache and lassitude, are normal.

The principal changes which take place during or in association with menstruation are to be found in the ovaries and in the uterus. In the ovaries the process known as ovulation, that is, the ripening and escape of an ovum from the ovaries, takes place, followed by the formation of the corpus luteum. The latter forms in the empty Graafian follicle in the following manner (Sobotta) :—The follicular epithelium begins to proliferate immediately the ovum is expelled, and, supported by a framework of connective tissue and blood vessels, soon fills the entire cavity of the follicle. When fully developed it forms a gland-like mass of polygonal cells rich in lutein, and very similar to adrenal

tissue, both macroscopically and microscopically. There is no difference, as was formerly supposed, between the corpus luteum found in association with an impregnated ovum and the corpus luteum found when impregnation does not occur. The functions of the corpus luteum are not definitely determined, but it is believed to possess an internal secretion which has a controlling effect on the embedding of the ovum, and the early development of the embryo (Fraenkel).

The secretion is believed also to cause rapid coagulation of the blood, and to have some effect in producing the normal cessation of menstruation.

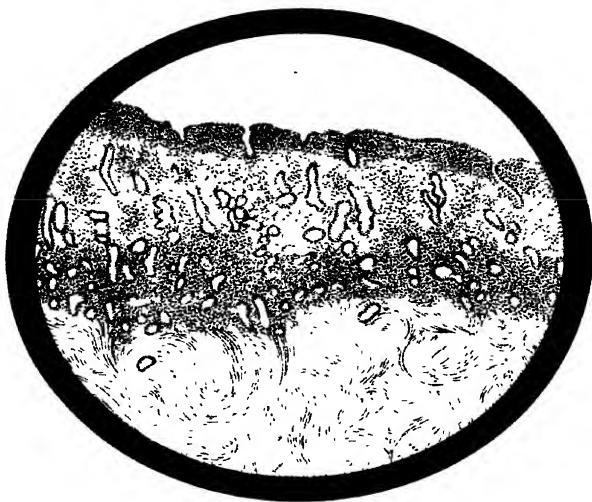
Usually, the ovum after it has escaped from the ovary enters the Fallopian tube, and is carried along it into the uterus. If the ovum is fertilised, it becomes embedded in the uterine mucous membrane. If it is not fertilised it is absorbed, or it passes into the vagina. The exact relation in point of time between ovulation and menstruation is not very clear, but in all probability the ovum enters the uterine cavity shortly after menstruation. According to some writers, ovulation and the formation of the corpus luteum have a constant relation to the changes which occur in the uterus. The bursting of the follicle and the beginning of the development of the corpus luteum occur in the first fourteen days after the onset of menstruation. They are coincident with the menstrual, post-menstrual, and interval changes in the uterine mucous membrane. The stages of vascularisation and ripening of the corpus luteum are coincident with the pre-menstrual period. The degenerative changes in the corpus luteum begin usually with the beginning of the menstrual period, and are associated with it and with the interval. Ovulation does not occur during pregnancy.

In considering the changes which occur in the uterus in relation to menstruation, one must divide the menstrual cycle into four periods. These are as follows :—

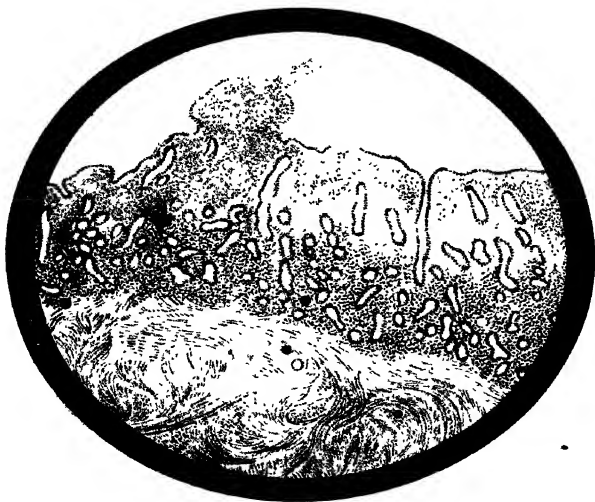
- (1) The post-menstrual period,
- (2) The interval.
- (3) The pre-menstrual period.
- (4) The menstrual period.

The post-menstrual period lasts for five days, the interval lasts approximately for fifteen days, the pre-menstrual period lasts for five days, and the menstrual period lasts for three days. During the post-menstrual period the glands of the endometrium are empty, and are non-functioning; the mucous membrane is thin and anæmic. During the interval the blood supply of the mucous membrane is gradually increasing until, towards the end, it comes into a condition of hyperæmia. During the pre-menstrual period the mucous membrane is very hyperæmic, the glands are in full function secreting mucus,

Plate I.



**The premenstrual congestion of the uterine mucous membrane. X 30.
(Jolly.)**



The manner in which blood escapes from the congested mucous membrane during menstruation. X 30. (Jolly).

the mucous membrane is thick, the epithelium is very swollen and well defined, and the stroma cells are swollen and pale. During the menstrual period mucus and blood escape, and the œdema of the epithelium and stroma cells continues. The cause of the hæmorrhage is considered by some to be the eating through of the walls of the dilated capillaries by trypsin, which is present in the mucous secretion which escapes during the pre-menstrual period. This trypsin will digest albumin in the presence of an alkali, and to it is also due the œdema of the superficial stroma cells at this stage. The surface epithelium then ruptures from increased pressure, and visible menstruation occurs.

In order that menstruation may occur normally and regularly certain conditions must be fulfilled. First, the generative system must be normal. Secondly, the circulatory system must also be normal, and the character and quantity of the blood. Thirdly, the nervous system, in so far as it relates to the genital system, must work normally. Fourthly, the ductless glands, amongst which one may include the ovaries themselves, must produce their secretion in due harmony with the needs of the body. The only one of these factors which it is necessary to discuss at any length is the ductless glands. It is obvious that if the uterus and ovaries do not undergo their proper development at puberty, or if they are congenitally absent, or seriously malformed, they cannot function properly, and menstruation cannot occur normally. Similarly, if the quantity of blood and the character of the blood in the body is insufficient to allow the necessary hyperæmia of the uterine vessels during the pre-menstrual stage, menstruation cannot normally occur. The manner in which the nervous system affects menstruation is perhaps more obscure, but it is probably connected with the vaso-motor requirements of the uterus. The effects of the secretion of the ductless glands, both on the development of the genital organs at the time of puberty and on menstruation itself, have lately received a considerable amount of attention. Blair Bell, in particular, has endeavoured to elaborate their mutual relations, and in what follows we reproduce his views. He tries to show that even though the genital organs are present and normal at birth, puberty does not follow unless there is harmony between all the ductless glands. Thyroid or pituitary insufficiency causes the genital organs to remain infantile, and unless the thymus atrophies they also remain undeveloped. Oöphorectomy in young animals causes the uterus to remain infantile. If performed during adult life the uterus atrophies. Thyroidectomy produces atrophy of the uterus, although, conversely, it tends to cause an increase in ovarian activity. If the internal secretion of the ovary is insufficient the tendency is towards limitation of the menstrual discharge. Excessive ovarian secretion, on the

other hand, causes menorrhagia. Thyroid insufficiency always causes diminished menstruation or even amenorrhœa, according to its degree. Dysmenorrhœa may also occur. Excess of thyroid secretion tends to cause menorrhagia in young girls. Pituitary insufficiency is associated with amenorrhœa or scanty menstruation. Excess of pituitary secretion tends to cause the development of masculine characteristics, with which amenorrhœa will be associated. Suprarenal insufficiency causes amenorrhœa, due to general disturbances and to uterine atrophy. Excess of suprarenal secretion also causes amenorrhœa and sterility. Excess of thymus secretion, due to the persistence of the thymus glands, causes amenorrhœa and undeveloped genital organs.

The best explanation of the regular four-weekly recurrence of menstruation is that menstruation is a cyclical process, exactly as is respiration or the action of the heart. The respiratory cycle lasts for four seconds, the cardiac cycle for a little less than one second, while the generative cycle lasts for four weeks.

AMENORRHŒA.

Amenorrhœa (ἀ, negative; μήν, a month; ῥέω, I flow) is the term applied to the non-appearance or disappearance of the menstrual discharge during the normal "menstrual life" of a woman. This disappearance may occur as a physiological or as a pathological process. It is a physiological process when it occurs as the result of pregnancy or lactation; it is a pathological process when it results from either local or general disease.

Pathological amenorrhœa, with which we are alone concerned, may be divided into two classes:—

- (A) Apparent amenorrhœa.
- (B) Actual amenorrhœa.

(A) **Apparent Amenorrhœa.**—By apparent amenorrhœa, or cryptomenorrhœa (κρυπτός, hidden; μήν; ῥέω), is meant that there is no external appearance of menstrual discharge, although the ordinary menstrual changes are taking place inside the uterus in the usual manner. Such a condition is the result of an obstruction, congenital or acquired, to the outflow of the menstrual fluid. Obstruction is usually caused by an imperforate hymen; rarely it arises as a result of congenital occlusion of the vagina or cervix, or from acquired obstruction of these passages due to their cicatricial obliteration.

(B) **Actual Amenorrhœa.**—By actual amenorrhœa is meant that there is a complete cessation, either temporary or permanent, of the physiological escape of blood from the uterine blood-vessels. It must,

however, be remembered that the occurrence of actual amenorrhœa does not by any means imply that ovulation is not going on in a normal manner. In some cases this latter process is completely suppressed, if it had ever started; in other cases it continues, although there may be no menstrual discharge associated with it.

We have seen that menstruation is dependent on the healthy condition of certain of the great systems of the body, and so it follows that any interference with the functions of these systems may bring about amenorrhœa. These systems are:—

- (1) The generative system.
- (2) The circulatory system.
- (3) The nervous system.
- (4) The ductless glands.

(1) *The Generative System*.—Amenorrhœa occurring as the result of pathological conditions of the generative system may be due to:—

- (a) Congenital absence of uterus or ovaries.
- (b) Removal of uterus or ovaries by operation.
- (c) Atrophy of ovaries or endometrium or complete destruction by inflammatory disease, by new growths, or after parturition (hyperinvolution).

(2) *The Circulatory System*.—All diseases or conditions in which the amount of blood is lessened or altered in quality tend to produce amenorrhœa. The chief of these are anæmia, chlorosis, leucocythæmia, and all conditions which give rise to profuse or frequently repeated hæmorrhages. All debilitating conditions will also come into this list. Amongst such conditions may be mentioned tuberculosis, malignant disease, the final stages of cardiac and renal disease, debilitating fevers during the period of pyrexia and of convalescence, and various toxic conditions, as in chronic poisoning by lead, mercury, morphia, and alcohol.

(3) *The Nervous System*.—General paralysis and other forms of nervous disease frequently produce amenorrhœa. So-called "reflex amenorrhœa" is said to be caused by sudden chills, iced drinks, or cold baths, just before the appearance of the flow. Such conditions may give rise to a very temporary amenorrhœa lasting for one period; but it is difficult to understand how they could produce a more permanent effect. Finally, there is the condition known as "sympathetic amenorrhœa," i.e., amenorrhœa occurring in patients who are very anxious to believe themselves to be pregnant, or who are persuaded that they have reached the menopause.

(4) The ductless glands may produce amenorrhœa in one of two ways:—first by interfering with the development of the genital system, and secondly by interfering with the normal menstrual

processes in the case of a normally developed genital system. We have already seen how abnormalities of secretion affect menstruation. Absence of the ovaries, or absence of their internal secretions before puberty, prevents the development of the uterus. Removal of the ovaries after puberty, or ovarian insufficiency, tends to cause a gradual disappearance of the menstrual discharge. Thyroid insufficiency, pituitary insufficiency or excess of secretion, and suprarenal insufficiency or excess of secretion, all tend to cause amenorrhœa, and frequently sterility, while the persistence of the thymus gland is accompanied by failure of development of the genital organs. In thyroid insufficiency, the patients are often obese, and lack energy, and pains in the breast may occur before each period.

Treatment.—The treatment of amenorrhœa of genital origin will be considered under its proper headings. Here, we shall only discuss the treatment of cases of extra-genital origin. Where amenorrhœa is due to circulatory disturbance, particularly anæmia, treatment consists in regulating the functions of the body, particularly the bowels, and the administration of iron, suitable food, and suitable tonics. Change of air is also often advisable. Where amenorrhœa is due to such conditions as tuberculosis, malignant disease, and the later stages of cardiac and renal disease, there is nothing to be gained by trying to treat it. If the general condition of the patient improves, then menstruation will gradually reappear. Cases of toxic origin can only be treated by the removal of the cause. Amenorrhœa due to lesions of the nervous system does not call for treatment. If the primary lesion can be cured, then the amenorrhœa will probably gradually disappear.

The treatment of amenorrhœa due to anomalies in the secretion of the ductless glands has received a good deal of attention, and various organic extracts made from these glands have been tried, in some cases with considerable success. Where it is believed that the ovarian secretion is insufficient, benefit has been obtained by the administration of ovarian extract. Where the ovaries were absent, attempts have been made, sometimes with temporary benefit, to introduce grafts taken from the ovaries of other patients, but, as a rule, these grafts are soon absorbed. Thyroid insufficiency is met by the administration of thyroid extract. According to Blair Bell, it should be given from the twenty-fourth day of the cycle until menstruation occurs, three grains of the dried gland being taken at bedtime. In pituitary insufficiency, extract of the pituitary glands may be tried. The usual dose is 1 cc. given subcutaneously daily for ten days. In suprarenal insufficiency, extract of the suprarenal gland is sometimes found of use. So far, however, no treatment has been found of any avail for excess of suprarenal or of pituitary secretion.

MENORRHAGIA AND METRORRHAGIA.

Menorrhagia (μήν; ῥήγνυμι, I burst forth) is the term applied to excessive menstrual discharge. Metrorrhagia (μήτρα, the womb; ῥήγνυμι) is the term applied to hæmorrhage occurring between the normal periods of menstruation. It is most frequently found in association with menorrhagia. As in the case of amenorrhœa, the causes of menorrhagia and metrorrhagia may be divided into those arising in :—

- (1) The genital system.
- (2) The circulatory system.
- (3) The nervous system.
- (4) The ductless glands.

(1) *The Genital System*.—All the causes of menorrhagia and metrorrhagia, arising as a result of disease of the genital system, may be traced to the one factor—congestion, and any condition which predisposes to, or causes, congestion will, *ipso facto*, favour the occurrence of menorrhagia. The commonest of these factors is endometritis, while tumours of the uterus or ovaries, inflammatory conditions of these organs, displacements, placental or decidual remains lying in the uterus, extra-uterine pregnancy, and sub-involution must also be remembered.

(2) *The Circulatory System*.—All conditions which tend to raise the blood-pressure must be considered as causes of menorrhagia. Amongst these come the earlier stages of heart and renal disease, hepatic cirrhosis, tumours which compress the portal vein or inferior vena cava, emphysema of the lungs, bronchiectasis, and fevers.

(3) *The Nervous System*.—As certain conditions are seen to cause “reflex amenorrhœa,” so certain ill-defined conditions may cause “reflex menorrhagia.” The chief of these are too frequent coitus, falls—especially on the breech, too frequent use of hot baths, severe mental emotions, and occasionally perhaps mental disease.

(4) *The Ductless Glands*.—As we have seen, excessive ovarian secretion and excessive thyroid secretion tend to cause menorrhagia.

Treatment.—The treatment of menorrhagia and metrorrhagia of genital origin will be discussed in its proper place, according to the lesions to which they are due. Here, it is only necessary to say that one must be very careful indeed to exclude all possibility of genital origin before regarding any case of menorrhagia or metrorrhagia as due to an extra-genital cause. The treatment of cases due to causes in the circulatory or the nervous system is, in the main, the treatment of the primary disease, and does not come within the scope of this work. The treatment of cases due to abnormalities of the secretion of the ductless glands is more important. In hæmorrhage due to ovarian secretion the administration of supra-renal and pituitary extracts has

been recommended, while in cases due to excess of thyroid secretion calcium lactate is said usually to give good results.

DYSMENORRHOEA.

Dysmenorrhœa (δύς, with difficulty ; μήν ; ρέω) is the term applied to painful menstruation. In some women, menstruation is always attended by a certain amount of pain, or perhaps it would be better to say by a certain amount of discomfort, and this condition cannot be called dysmenorrhœa. The term must rather be confined to those cases in which menstruation is accompanied by pain sufficiently marked, either owing to its unaccustomed occurrence or to its degree, to be attended by marked nervous or constitutional disturbance.

The causes of dysmenorrhœa may be divided into two classes :—

(A) Causes situated in the genital tract.

(B) Extra-genital causes.

(A) Causes situated in the Genital Tract.—The genital dysmenorrhœa, so far as we know them, are as follows :—

(1) Undeveloped conditions of the uterus or ovaries.

(2) Inflammatory lesions of the uterus, ovaries, or tubes, including so-called “ erosions ” and ectropion of the cervix, and the various conditions which are grouped under the term endometritis. *Hydrone of ut.*

(3) Displacements of the uterus which involve the presence of a sharp bend in the lower portion of the utero-cervical canal.

(4) Tumours of the uterus, ovaries, or tubes.

(5) Congenital or acquired stenosis of the cervical canal.

It is probable that most of these causes act by producing congestion of the uterus or appendages, or by interfering with the normal rupture of the Graafian follicle during ovulation. Congestion causes an excessive increase of vascular tension during menstruation, and so produces increased pressure upon the terminal nerve filaments. When dysmenorrhœa is not due to congestion, a mechanical cause can generally be found for it. This usually takes the form of an obstruction to ovulation, or to the escape of the menstrual fluid. An obstruction to ovulation may be brought about by peri-oöphoritis, in which condition the thickening of the capsule of the ovary prevents the rupture of the Graafian follicle. In such cases the ovaries usually contain numerous cysts arising in the Graafian follicles. An obstruction to the escape of the menstrual fluid may be caused by stenosis or atresia of the cervical canal, by tumours or congested endometrium blocking the os internum, and by acute flexions of the uterus.

In some extremely rare cases the entire mucous membrane of the

uterus becomes detached at each menstrual period, and is expelled, causing during the latter process severe dysmenorrhœa. To this condition the term membranous, or exfoliative, dysmenorrhœa has been given. The ætiology of this condition is somewhat obscure. Undoubtedly, many cases, in which casts of the uterus have been expelled, were in reality cases of abortion or of extra-uterine pregnancy, but also well-authenticated cases of true membranous dysmenorrhœa have occurred, in which there was no possibility of the condition being due to either of these causes. If the menstrual blood comes from the superficial group of capillaries of the endometrium under normal circumstances, it is possible that in these cases the hæmorrhage comes from the submucous capillaries, and that, its escape thence being impeded, it causes a detachment of the mucous membrane. Another theory is that, owing to certain causes, unduly strong contractions of the uterus occur, as a result of which the entire mucous membrane is thrown off in the same manner that the placenta is detached after delivery. Such a process is, however, scarcely possible unless an excessive degree of hypertrophy of the endometrium had previously occurred.

(B) **The Extra-genital Causes of Dysmenorrhœa.**—It must be recognised that such causes exist, although it is very difficult in any case to state definitely what these causes are. Speaking generally, they will be found to fall under one of the following headings:—

- (1) General ill-health, anæmia, chlorosis, etc.
- (2) Rheumatic or gouty tendencies.
- (3) Neuralgia.
- (4) Neurasthenia.

Treatment.—The treatment of dysmenorrhœa of genital origin comes more properly under the treatment of the causal lesion. The treatment of cases of extra-genital origin may be discussed here. Cases due to general ill-health must be treated by the removal, wherever possible, of all causes that perpetuate such a condition, and by the judicious use of tonics and laxatives. Amongst the more common causes which call for direct treatment may be mentioned septic poisoning from carious teeth, nasal polypi, adenoids, constipation, hæmorrhoids and appendicitis, improper or insufficient food, and the various forms of anæmia. Dysmenorrhœa occurring in patients with a rheumatic or gouty tendency, in whom no other cause can be found, should be treated for the rheumatism or gout, as the case may be. Patients in whom the condition can only be attributed to a local neuritis may be treated in a somewhat similar manner, such drugs as phenacetin, antipyrin, aspirin, acetanilid, and the bromides being of use. Neurasthenic cases are perhaps the most difficult of all. Benefit may be obtained by change of scene, and such remedial measures

as are likely to cause a mental improvement. We should be very slow to class any case of dysmenorrhœa under this heading, unless careful examination failed to show any positive cause, and the general temperament of the patient pointed towards a nervous origin. The wider our experience and knowledge are, the fewer neuræsthenic cases we see, because we become able to detect causes that formerly escaped us. Finally, it is necessary to warn carefully against the dangerous consequences that may result from the use of alcohol or any of the preparations of opium in the treatment of dysmenorrhœa.

LEUCORRHŒA.

Leucorrhœa (λευκός, white; ῥέω) is the term applied to discharge of a non-sanguineous character coming from the genital tract. Strictly speaking, the term applies only to a mucoid or purulent discharge, but, practically, it is often applied to discharges of a serous or watery character. The causes of leucorrhœa may be divided into two groups :—

(A) Causes situated in the genital tract.

(B) Extra-genital causes.

(A) **Causes situated in the Genital Tract.**—These causes are as follows :—

(1) Inflammatory lesion of the uterus, vagina, or vulva.

(2) Alteration in the character of the endometrium, or of the cervical mucous membrane, leading to hypertrophy and increased discharge from the glands.

(3) Tumours affecting the mucous membrane of the uterus, vagina, or the vulva, especially tumours which are breaking down or undergoing any form of degenerative change.

(B) **Extra-genital Causes.**—These causes are not of great importance, although in the past it has been customary to consider them as very common. Under this head may be placed conditions of ill-health, such as anæmia, which leads to a watery condition of the blood, with a consequent tendency to transudation of serum from mucous surfaces, and also any condition that tends to promote congestion of the genital organs, apart from actual disease of them. Amongst such conditions may be mentioned marked constipation, pressure of abdominal tumours, ascites, and perhaps hæmorrhoids. In our opinion it is never wise or safe to assume an extra-genital origin for leucorrhœa, unless it has been positively demonstrated by direct examination that no local cause exists.

The commonest genital causes are infection and glandular changes in the endometrium and the cervix. Infection produces leucorrhœa in two ways :—first, by causing an excessive activity of

the cervical or uterine glands, and sometimes of the vulvar glands, and secondly, by producing an unhealthy condition of the mucous membrane of the vagina, which loses its superficial epithelium in places, thus paving the way for the entrance of organisms directly into the deeper layers, and so causing an exudation of serum from the vaginal vessels. It is still an open question as to whether glandular changes of the uterine and cervical mucous membrane ever occur apart from infection of some kind, but, if they so occur, it is obvious that they too will be associated with mucous discharge. Tumours which have not begun to break down cause leucorrhœa by their effect on the adjacent glands. After they have broken down the discharge comes from the necrosing or sloughing surface of the tumour itself. Amongst such tumours may be mentioned myoma, sarcoma, and carcinoma of the uterus, cervix, or vagina, and mucous polypi. It can thus be seen that while leucorrhœa may be the symptom of some trifling inflammatory condition, it may also be the symptom of some of the gravest forms of genital disease. This remark applies not alone to married or elderly women, but also to quite young women, and due attention should be paid to this fact, because in the past it has been customary to attribute the leucorrhœa of girls to some slight constitutional disturbance, and to treat it with too little care. We have seen a girl of nineteen in whom the leucorrhœa was due to advanced sarcomatous change in the body of the uterus.

Treatment.—The treatment of leucorrhœa of genital origin will be discussed in its proper place, according to the cause. If, however, leucorrhœa is found in any case positively not to be associated with any local lesion, then an attempt should be made, if the amount of leucorrhœa is considerable, to ascertain any possible extra-genital cause. As a rule, if such conditions as abdominal tumours, hæmorrhoids, or cystitis are excluded, the cause will be found in constipation or anæmia, and these conditions must be suitably treated by tonics and laxatives.

CHAPTER III.

DISEASES OF THE BLADDER AND URETHRA.

The Bladder : Cystitis ; Ætiology, Symptoms, Treatment, Tumours, Displacements, Vesical Fistulæ, Cystoscopy—The Urethra : Tumours—Prolapse of the Urethral Mucous Membrane—Dilatation and Sacculation.

THE BLADDER.

CYSTITIS.

CYSTITIS (κύστις, the bladder) is the term applied to inflammation of the mucous membrane of the bladder.

Ætiology.—Cystitis may arise in any of the following ways :—

(1) By infection carried upwards through the urethra. This is much the most common mode of infection. In cases of pre-existing vaginitis or urethritis, bacteria may be carried into the bladder on catheters or other instruments, or may make their way in by gradual extension of the infection upwards. Also, even when there are no bacteria in the urethra, they may be carried into the bladder by means of dirty instruments.

(2) By infection travelling downwards from the kidneys or ureters. In this case the bacteria may come from an already infected kidney or ureter, or they may be eliminated from the blood by a healthy, or comparatively healthy, kidney.

(3) By infection extending directly from a neighbouring septic area. This extension may occur if the bladder wall becomes involved in the inflammatory changes which take place in the tissues surrounding a septic area, or if an abscess formed in some neighbouring structure bursts into the bladder.

(4) By infection reaching the bladder through the blood.

The mere presence of bacteria in the bladder is probably not sufficient to bring about cystitis, and there must also be some predisposing cause which renders the bladder wall liable to attack. It is probable that we do not know all these causes, but two of them are to be found in any condition which prevents the complete emptying of the bladder, and in lesions of the epithelium lining the cavity.

The bacteria which are most commonly met with in cystitis are the *bacillus coli communis*, gonococcus, streptococcus, staphylococcus, and tubercle bacillus.

Symptoms.—In the acute stage, the most prominent symptom is

intense irritability of the bladder, as shown by scalding pain, constant inclination to pass water, and extreme tenderness of the bladder and the surrounding parts. There is also some elevation of temperature and general constitutional disturbance. The urine is passed in extremely small quantities, and is very turbid. It contains a varying amount of pus, and consequently some albumin, and in very acute cases there may be a little blood. On microscopical examination, one finds quantities of dead leucocytes, squamous epithelium, a few red blood-corpuscles, and bacteria. As the acute stage passes off, the irritability of the bladder becomes less, and the high temperature and constitutional disturbances disappear. If the chronic stage lasts for a long period, the bladder walls become thickened, a fact which can be determined by bimanual examination. In tuberculous cystitis it is usually possible to discover the tubercle bacillus, if repeated examinations are made of the sediment obtained by centrifuging the urine.

Treatment.—In the acute stage, interference with the bladder should be avoided, as it probably only increases the congestion. The patient must be kept in bed, and our efforts directed to relieving the pain. With this object, hot fomentations should be applied over the abdomen, and copious vaginal douches may be administered. At the same time, it may be necessary to inject morphia hypodermically, if the pain is very severe. Hyoscyamus, combined with benzoate of soda—the latter acting as a urinary acidulant—and with infusion of buchu, is also of value. Urotropin in doses of from five to fifteen grains administered three times a day is a valuable urinary antiseptic, and is specially useful in cases of cystitis due to the *bacillus coli communis*.

As soon as the acute stage has passed off, as shown by the diminished frequency of micturition, the bladder may be washed out every second or third day. For this purpose one of the following solutions is used:—Saturated solution of boracic acid; cyllin solution, at first of a strength of two drachms to the gallon, and gradually increased to double that strength; boro-glyceride (Barff's) about half an ounce to the pint. When the infection is probably gonorrhœal in origin, very weak formalin solution is useful. Begin with a quarter to a half per cent. solution, and increase the strength gradually up to two per cent. as the patient will bear it. We have found protargol—a silver salt containing eight per cent. of silver—of considerable value in the treatment of cases of cystitis of septic origin. It is used at a strength of from one-half to two per cent. in aqueous solution, and may be allowed to remain in the bladder for from ten to fifteen minutes or even longer. It causes no pain or discomfort. Very weak solutions of nitrate of silver (five grains to the ounce) are also said to be of value.

Irrigation of the bladder is most easily carried out in the following

manner. Pour the solution to be used, at a temperature of about 95° F., into an ordinary jug—from which it can be drawn off by means of a syphon douche, or into a glass or metal douche can. After washing the external genitals, a medium-sized Bozemann's catheter is fixed to the end of the tube, and passed gently upwards into the bladder. The fluid is allowed to flow, and by closing with the thumb the hole in the catheter for the return flow of water the bladder is distended as much as the patient can bear. Then the finger is taken off the opening and the fluid is allowed to escape. By repeating this process four or five times the bladder is emptied of the purulent accumulation which it contained. If a case of presumed cystitis is not relieved by such treatment, the inside of the bladder should be examined with Nitze's cystoscope in order to ascertain the exact condition present. If the interior of the bladder is then found to be healthy, and if there are not foreign bodies present, such as calculi, the ureters should be catheterised and the urine from each collected separately for examina-

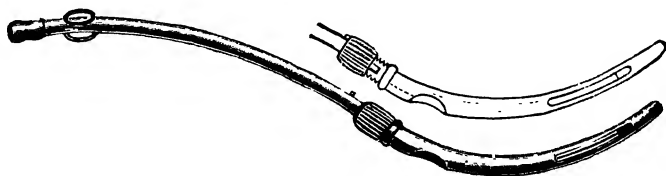


FIG. 11.—Bozemann's return catheter.

tion. In this way the existence of unsuspected renal disease will sometimes be determined.

Frequent catheterisation of the bladder is liable to cause cystitis, even if the catheter itself is always sterile. This is probably due to the fact that in such cases pyogenic bacteria are to be found in the urethra, from which they cannot be removed by any preliminary disinfection. It is therefore well, in all cases in which frequent catheterisation has to be performed, to wash out the bladder with boric lotion each time the catheter is passed, in order to remove any bacteria which may have been carried up from the urethra before they have had time to do mischief. This washing out can be easily done with a funnel and a rubber tube. The latter is slipped over the end of the catheter as soon as the bladder is empty, the boric lotion is injected, and is then allowed to escape by removing the rubber tube.

For internal use, the following drugs are recommended :—Benzoate of soda and of ammonia, both for their antiseptic effect and with the object of rendering the urine acid ; quinine, as a sedative and antiseptic ; salol and urotropin, as antiseptics ; and salicylate of soda, with the same object. In gonorrhœal cases, oil of sandal-wood and copaiba are of use.

In very chronic cases which have resisted all other methods of treatment, relief is sometimes obtained by making a fistula between the vagina and the base of the bladder. This ensures that the latter is kept empty, and also enables it to rest from its functions of alternately distending and contracting.

The operation is a very simple one. A posterior speculum is introduced into the vagina and the anterior vaginal wall exposed. A metal catheter is passed into the bladder, and pushed against the posterior bladder wall in such a manner as to cause a prominence on the anterior vaginal wall in the middle line. By cutting on to the tip of the catheter, an opening of about three-quarters of an inch in length is made into the bladder. Three or four sutures are then passed through both vaginal and bladder walls just outside the cut edges of the opening, in such a manner that when tied they will bring the vaginal and bladder mucous membranes into contact. By this means, the subsequent closing of the opening is prevented.

The fistula is allowed to remain open for a time varying from a few weeks to a few months. This line of treatment will undoubtedly tend to cure the cystitis, but it replaces one pathological condition by another, as the patient has all the trouble and annoyance caused by a vesico-vaginal fistula. Another objection is that when the time comes to close the fistula, it is often found that the bladder has become so contracted that the patient has to pass water very nearly as frequently as when she was suffering from the cystitis.

TUMOURS OF THE BLADDER.

The benign tumours met with in the bladder are as follows:—Papilloma, fibroma, adenoma, myoma, and dermoid cyst. The malignant tumours are carcinoma and sarcoma. Mixed tumours may also occur owing to the association of benign and malignant tumours.

Symptoms.—The first and chief symptom of most bladder tumours is bleeding. Such bleeding may be slight and only sufficient to colour the urine, or it may be considerable or even profuse. Other symptoms are frequent micturition, or, more rarely, retention or incontinence of urine. Pain also sometimes occurs, and is probably due to an associated cystitis.

Diagnosis.—The diagnosis of a bladder tumour may be made by bimanual examination of the thickened bladder wall, or of the tumour itself when the enlargement is sufficient to render it palpable, and by cystoscopy. It is a golden rule in all cases of hæmaturia to cystoscope the bladder, and then, if a bladder origin can be excluded, to examine the secretion of each kidney separately. If a tumour is found, we must take into consideration whether it is single or multiple,

its point of origin, its size, colour, and shape, the nature of its pedicle if it possesses one, and the presence of any complication such as cystitis. To complete the diagnosis a small portion of the growth should be removed and examined microscopically.

Treatment.—Tumours of the bladder must be removed whenever possible. We cannot enter here in detail into the different methods by which removal can be effected, and can only refer to the different routes which can be followed.

Small and benign tumours can be removed through a large urethral cystoscope by means of the galvano-cautery loop or the knife, or may be destroyed by the high frequency current. Similar, or slightly larger, tumours can be removed through a vaginal incision, while large tumours must be removed through a supra-pubic incision. Similarly, portions of the bladder wall can be excised either through the vagina or from above the pubis, according to their situation. Lastly, in cases of malignant disease, the entire bladder has been successfully removed.

DISPLACEMENTS OF THE BLADDER.

Displacements of the bladder may be divided into groups almost identical with those into which we shall subsequently divide displacements of the uterus. These groups are as follows :—

- (1) Upward displacement.
- (2) Downward displacement.
- (3) Lateral displacement.
- (4) Inversion.

Upward displacement is usually due to the presence of a tumour below the bladder pushing the latter upwards. The commonest instance of such a tumour is a fibro-myoma of the uterus so situated as to involve both the cervical and fundal regions. Downward displacement, or cystocele, is the result of injuries of the pelvic floor, and of prolapse of the uterus either in association with, or independent of, such injuries. Lateral displacements are due to the presence of tumours in the pelvis, or to unilateral inflammatory masses such as pelvic cellulitis. Inversion of the bladder is a very rare condition, and is due to causes similar to those of uterine inversion.

Displacements of the bladder, with the exception of inversion, are *per se* of little importance, unless they cause obstruction of the ureters or urethra, or difficulty in completely emptying the bladder. Their treatment, save in the case of inversion, consists in the removal of their cause wherever possible, and so will be discussed later when we deal with the different kinds of pelvic tumours, uterine and vaginal displacements, and perinæal lacerations.

Inversion of the bladder always calls for immediate treatment. To replace the inverted bladder the patient is placed in the knee-chest position, and by compression and manipulation the inverted walls are gradually pushed back again through the urethra. If the condition tends to return it will probably be necessary to perform some operation with the view of narrowing the urethra.

VESICAL FISTULÆ.

Vesical fistulæ will be discussed in the chapter dealing with traumata of the genital organs.

CYSTOSCOPY.

Cystoscopy (κύστις, the bladder; σκοπέω, I see) is the term applied to the visual examination of the bladder. This most useful procedure can be accomplished by an electric cystoscope, such as Nitze's, by means of which it is also possible to catheterise the ureters and to draw off the urine separately from each kidney. In this way most valuable information can be obtained in cases of suspected disease of the kidneys.

Indications.—Cystoscopy is indicated under the following circumstances:—

- (1) In cases of persistent chronic cystitis, with the object of ascertaining the cause of the condition.
- (2) In cases of suspected disease of one kidney, with the object of establishing a diagnosis, and of determining which kidney is diseased.
- (3) In cases of hæmaturia.

Instruments.—For the examination of the bladder with Nitze's cystoscope, the following apparatus is required:—

- (1) Nitze's cystoscope. There are two forms of this instrument, one for cystoscopy alone, and the other both for cystoscopy and for ureteral catheterisation. The former instrument is more suitable for cystoscopy, as it gives a larger field of vision, but if the operator only possesses a single instrument, it should be the second form, as it can be used for both purposes (v. Fig. 13).
- (2) Ureteral catheters for use with the second form of cystoscope.
- (3) A primary battery, or an accumulator, capable of giving an effective current of twelve volts for an hour at a time.
- (4) A rheostat, i.e., a resistance for cutting down the amount of current.

- (5) A funnel and rubber tube, and catheter, or other means of introducing fluid into the bladder. Also a measure glass for measuring the amount of fluid introduced.
- (6) A black cloth for covering the head when using the cystoscope, and so shutting out extraneous light.

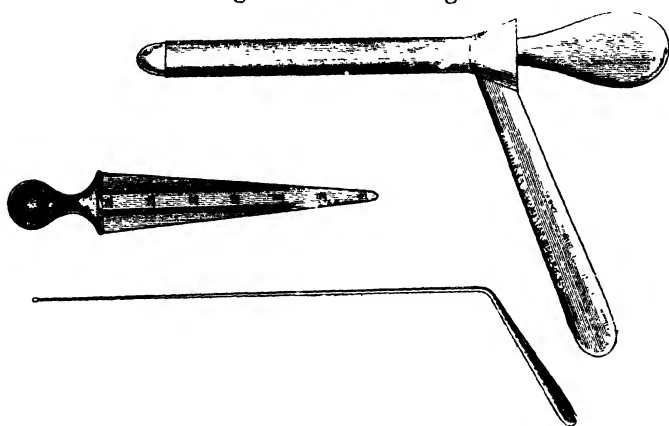


FIG. 12.—Kelly's vesical speculum, conical urethral calibrator, and ureteral searcher.

To use Nitze's cystoscope the patient must lie in the dorsal position on a gynæcological couch or table. An anæsthetic is not required

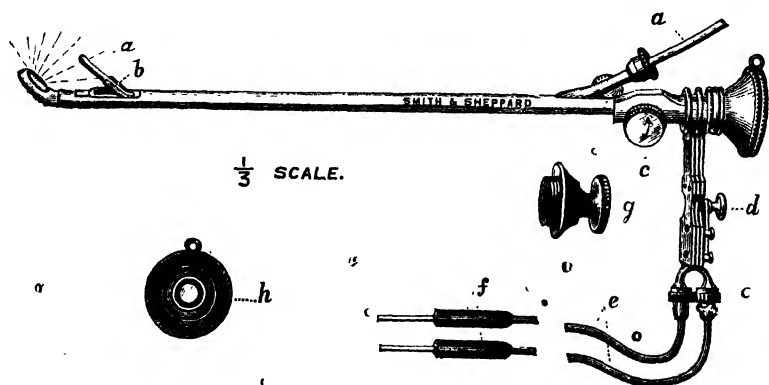


FIG. 13.—Nitze's ureteral and inspection cystoscope. *a*. Ureteral catheter. *b*. Catheter guide. *c*. Screw for moving catheter guide. *d*. Contact breaker. *e*. Battery cords. *f*. Terminals. *g*. Eye-piece cover. *h*. Eye-piece.

and indeed is not desirable, as the instrument causes little or no pain unless the tip is brought into and kept in too close proximity to the bladder wall. If this is done, it may cause pain, and the patient, if conscious, will call immediate attention to the fact, and so prevent any serious injury by burning. The first step in the operation is the distension of the bladder with a clear fluid. If the urine is clear it makes a good medium, but if the urine is at all turbid owing to the

presence of blood or pus, it must be carefully and gently drawn off, and a clear fluid substituted. The most suitable fluid for the purpose is either sterilised water or boracic acid solution, introduced at blood heat. If the bladder walls are inclined to bleed, the fluid must be

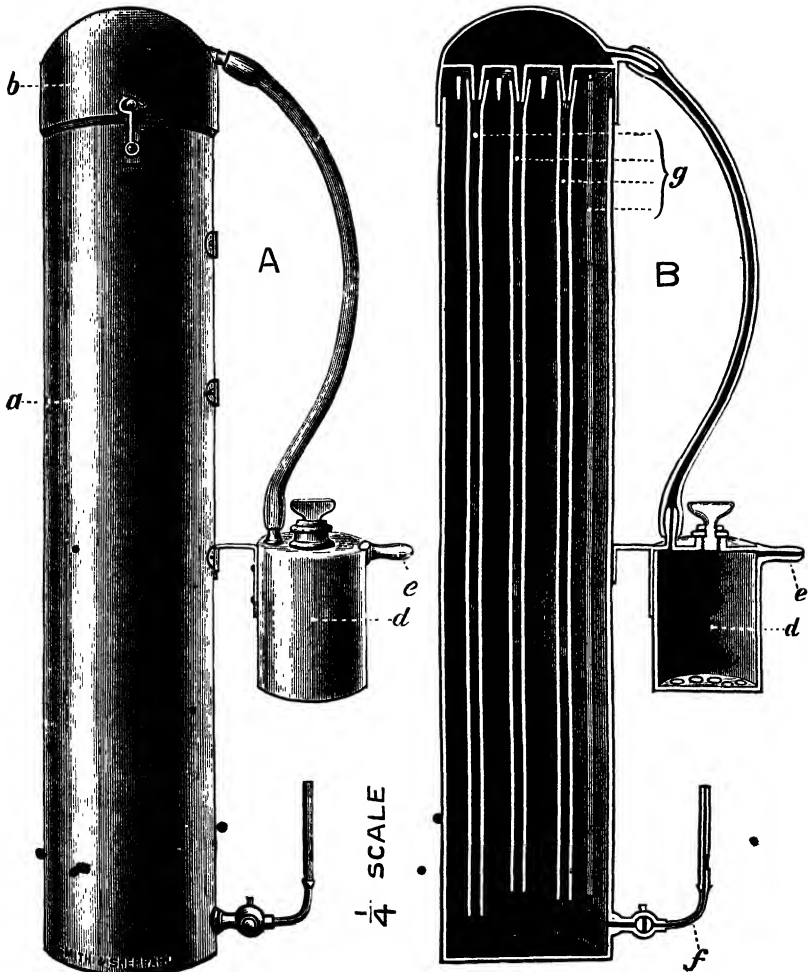


FIG. 14.—Catheter steriliser for use with formalin gas—German model. A. General view. a. Container for catheters. b. Cover. e. Gas inlet. d. Chamber for formalin tablets. B Sectional view g. Catheters in position. f. Gas burner.

introduced very slowly and gently, otherwise fresh bleeding may be set up, and any attempt at cystoscopy prevented. If there is a deposit of pus in the bladder it must first be washed away, and then clear fluid injected. The amount of fluid injected is of importance. If the bladder is over-distended the fundus is pushed away so far that it cannot be examined, and, if it is insufficiently distended, the mucous

membrane at its base hangs in folds and may hide the orifices of the ureters. It is best to begin by injecting six ounces, and then to examine the fundus and bladder wall generally. From four to six ounces more may then be injected, and the base of the bladder again examined. The cystoscope is introduced into the bladder just as is a catheter, with its lamp switched off. Care must be taken when using the catheter cystoscope that the point of the ureteral catheter or its guide does not protrude, as, if either of them did so, it would catch the urethral mucous membrane and might cause hæmorrhage, in addition to causing pain. As soon as the cystoscope is in position, the light is switched on. The orifices of the ureters can readily be found under normal conditions by turning the cystoscope slightly to each side of the middle line, so as to examine the base of the bladder.

If we want to catheterise the ureters, the catheter is gently pushed forwards with the fingers, and guided towards the ureteral orifice by raising or lowering the catheter guide with the screw as is seen to be necessary. Once the point engages in the orifice, its further introduction is easy.

Care must be taken not to keep the beak of the instrument in contact with the bladder wall. A momentary application is of no consequence, but a prolonged application may cause serious burns. This danger is, however, not now so great as formerly, owing to the introduction of the so-called "cool lamp."

When the examination is finished, the catheter is removed, the guide carefully turned down into its place, the light switched off, and the instrument gently withdrawn. Throughout the whole procedure the light should be switched off whenever it is not required, in order to prevent the overheating of the instrument.

The sterilisation of the cystoscope and of the catheters must be carefully carried out before and after use. The catheters can be sterilised best by means of vapourised formalin in the steriliser shown in Fig. 14. The cystoscope can be sterilised in the same manner or by prolonged immersion in a five to ten per cent. solution of formalin. After sterilisation, it is removed and carefully washed free of formalin and dried. It is well occasionally to put a little vaseline on the screws to prevent corrosion.

THE URETHRA.

TUMOURS OF THE URETHRA.

The new growths met with in the urethra are as follows:—

- I. Vascular caruncle.
- II. Fibroma and Myoma.
- III. Carcinoma.
- IV. Sarcoma.

I. VASCULAR CARUNCLE.—Vascular or urethral caruncle (*caruncula*, dim. of *caro*, flesh) is the term applied to a small growth of a bright red colour, which is found on the posterior aspect of the urethral orifice (v. Fig. 15). It is supposed to arise in connection with Skene's ducts—two small depressions situated in the floor of the urethra, and possibly to be the result of infection. It is usually about the size of a pea, and sometimes is pedunculated. Microscopically, it is most frequently found to consist of angiomatous tissue, and sometimes it resembles an adenoma.

Varieties.—Clinically, two varieties are met with :—painful caruncles and painless caruncles.

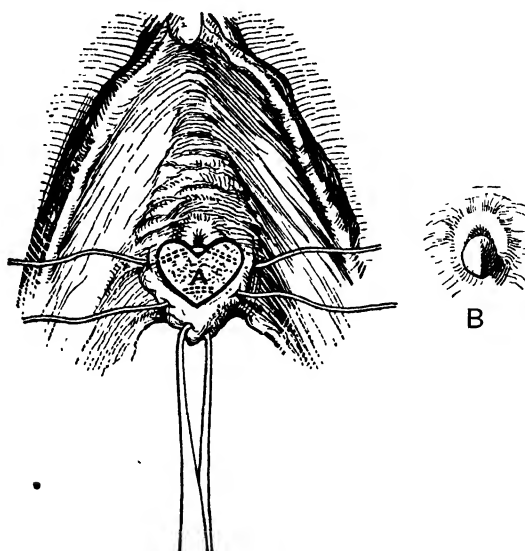


FIG. 15.—Removal of an urethral caruncle. A. The resultant wound with the sutures in position. B. The caruncle before removal.

Symptoms.—The painless form gives rise to no symptoms, and is only discovered accidentally in the course of a vaginal examination. The painful form is characterised by burning pain during micturition, and is extremely tender to the touch. Each form may give rise to slight hæmorrhage.

Treatment.—The painless form does not call for treatment unless it is causing hæmorrhage. The painful form can be removed by means of a V-shaped incision (v. Fig. 15), or by the actual or potential cautery.

II. FIBROMA AND MYOMA.—Both these tumours are excessively rare. The former originates in the connective tissue of the urethra, the latter in the muscular tissue.

III. AND IV. CARCINOMA AND SARCOMA.—Malignant growths of the urethra are also extremely rare. Carcinoma occurs as a primary growth starting in the mucous membrane, when it appears either as an irregular and elongated ulcer, or as a general circum-urethral ulceration. It is also seen as a secondary peri-urethral growth extending usually from carcinoma of the vulva.

Treatment.—Where the urethra alone is affected, wide excision of it and of the inguinal glands is indicated. Where the vulva also is affected, the treatment is the same as that of carcinoma of the vulva.

PROLAPSE OF THE URETHRAL MUCOUS MEMBRANE.

This somewhat rare condition occurs only in middle-aged and elderly

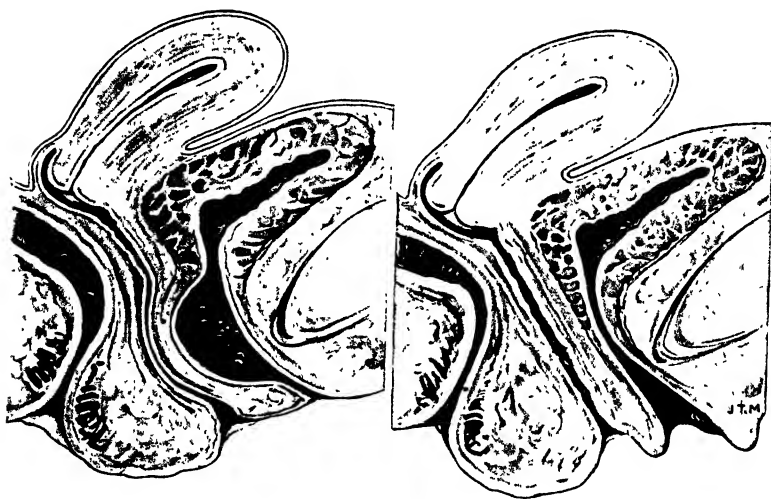


FIG. 16.—A. Dilatation of the middle third of the urethral canal. B. Dilatation of the lower third of the urethral canal.

women. In appearance, it somewhat resembles a caruncle. The latter is, however, usually limited to the posterior wall of the urethra, while in prolapse the entire orifice is surrounded by a red puffy ring.

Symptoms.—The principal symptoms, which this condition may cause, are burning pain on micturition, slight hæmorrhage, and tenderness to the touch.

Treatment.—Dissect off the prolapsed ring of mucous membrane, and suture the cut edge of the urethra to the vulvar mucous membrane by interrupted sutures of fine silk or catgut.

DILATATION AND SACCULATION OF THE URETHRA.

Dilatation of the urethra may occur in either the upper, middle, or lower third of the canal. It occurs in the upper third as a result of injury during childbirth, followed by paresis or total paralysis of the sphincter muscle. It may also occur as a result of the impaction of a calculus lower down in the canal. It probably affects the walls of the canal equally, causing uniform dilatation. Dilatation of the middle third of the canal usually affects the posterior wall alone, and is probably the result of injury during childbirth (*v.* Fig. 16, A). Dilatation of the lower third is a rare condition, except in association with prolapse of the mucous membrane. When it does occur, it may be due to artificial causes, or possibly to attempts at coitus in patients in whom the vagina is absent or malformed (*v.* Fig. 16, B).

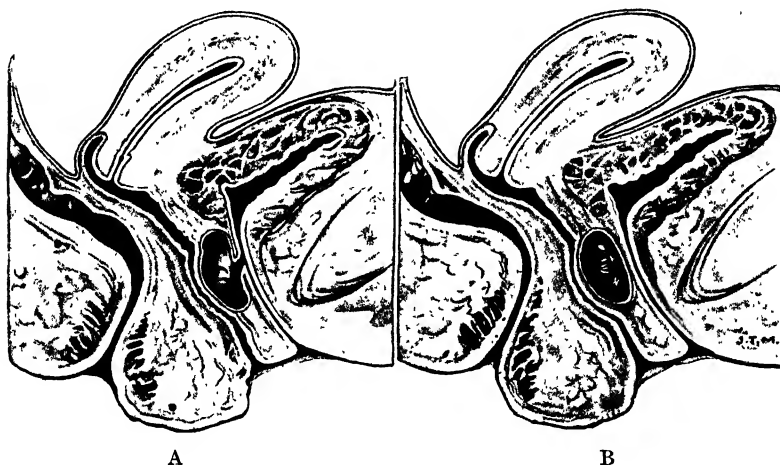


FIG. 17.—A. Sacculation of the urethra. B. Small cyst of anterior vaginal wall. These two conditions can easily be mistaken for one another.

Sacculation of the urethra, when it occurs, usually affects the middle third of the canal. It may result from any condition that injures the fibrous coat of the urethra at one spot. Yielding of this coat then occurs, followed by bulging of the mucous membrane through the weak area. Pressure inside the urethra causes the pouch thus formed gradually to increase in size, until eventually a considerable sacculation or diverticulum is formed, communicating with the urethra by a narrow opening (*v.* Fig. 17, A). It is also possible that such a condition may result from extra-urethral causes, such as suppuration in a vaginal cyst, with subsequent rupture into the urethral canal. In this case, the diverticulum is formed, not by an expansion of the mucous membrane of the urethra, but by the original cyst.

Symptoms.—The symptoms of dilatation of the upper third of the canal are dependent on the paralysis of the sphincter muscle, which causes incontinence of urine, with all its attendant troubles. The symptoms of dilatation of the middle third of the canal are not as a rule marked unless the condition is associated with obstruction of the canal below the dilated portion, or unless suppuration occurs in it. If there is kinking of the canal at any part of its course, there may be considerable difficulty in emptying the bladder, and the urethritis associated with dilatation will prove a most difficult condition to cure. The symptoms of dilatation of the lower third of the canal are in the main due to the accompanying prolapse of the mucous membrane.

Sacculation of the urethra sometimes gives rise to very acute symptoms, as the pouch becomes distended with urine which cannot escape, and which may undergo decomposition ending in the formation of an abscess. In the latter case, small quantities of pus escape at intervals through the urethra, setting up inflammation there, and tending also to cause an extension of infection into the bladder. If the sacculation becomes over-distended considerable pain is caused, and as probably there will be a tendency for more urine to be forced into it during micturition, the pain at that time becomes greater.

Diagnosis.—The only one of the foregoing conditions that is likely to cause any difficulty in diagnosis is sacculation, as it may be readily confused with a vaginal cyst (v. Fig. 17, B). Careful examination, however, with the sound or probe, will enable the connection between the sacculation and the urethra to be discovered, while if the symptoms of the case are such as to call for operation, the diagnosis will be obvious during the removal of the cyst.

Treatment.—The treatment of dilatation of the upper third of the urethra is in the main the treatment of the paralysed sphincter, and this is usually very unsatisfactory. Some good may be obtained by means of electrical treatment, but it will require to be continued for a long time. Occasionally, an anterior colporrhaphy, with the object of increasing the tension of the vaginal mucous membrane on the neck of the bladder and the upper part of the urethra, may do a little good. The treatment of dilatation of the middle third is in the main directed to curing any infection that may be present, and, while doing this, a certain amount of contraction of the canal may be obtained by the superficial application of caustics to the mucous membrane of the dilated posterior wall. Narrowing of a dilatation of the lower third can be effected by means of a plastic operation, and it may be necessary to associate with it excision of any prolapsed mucous membrane. The best treatment of a sacculation is excision of the cavity with careful closure of the urethral mucous membrane and of the fibrous wall of the urethral canal.

CHAPTER IV.

DISEASES OF THE VULVA AND PERINÆUM.

The Vulva. Vulvitis, Catarrhal Vulvitis, Exudative Vulvitis, Phlegmonous Vulvitis—Herpes—Eczema—Pruritus Vulvæ—Elephantiasis—Leucoplakia—Kraurosis Vulvæ—Tumours: Benign Neoplasms; Malignant Neoplasms, Carcinoma, Sarcoma—Hæmatoma—Retention Cysts—Herniæ—Hydrocele of the Canal of Nuck—Tuberculosis of the Vulva. The Perinæum.

THE VULVA.

THE term vulva, or external genitals, is applied to the following parts:—the mons veneris, the clitoris, the labia majora and minora, and the hymen. The principal pathological conditions which are met with in this region are as follows:—

Vulvitis.
Herpes.
Eczema.
Pruritus vulvæ.
Elephantiasis.
Leucoplakia.
Kraurosis.
Tumours.
Tuberculosis.

VULVITIS.

Vulvitis (*vulva*, the external female genitals) is the term applied to inflammatory conditions of the vulva.

Varieties.—It is an easy matter to distinguish a number of different forms of vulvitis due for the most part to different infecting organisms; it is, however, extremely difficult to make a satisfactory classification on such a basis. We have, therefore, endeavoured here, as also in the case of vaginitis and endometritis, to adhere as closely as possible to a classification based on the pathological changes present. Accordingly, vulvitis is classified in the following manner:—

- I. Catarrhal vulvitis.
- II. Exudative vulvitis.
- III. Phlegmonous vulvitis.

I. CATARRHAL VULVITIS.—Under the head of catarrhal vulvitis are included most of the common varieties of vulvitis.

Pathological Anatomy.—Catarrhal vulvitis in its simplest form consists in the occurrence of a superficial erythema of the skin, accompanied, in proportion to the severity of the case, by a variable amount of epithelial desquamation and serous discharge. This form is usually known as simple vulvitis, and, as instances of it, may be mentioned vulvitis due to constant scratching, diabetic urine, or dirt. In a more severe form, as will be described under the head of vaginitis, the papillæ of the true skin become affected, as well as the superficial epithelium, and usually there is an infection by pyogenic organisms. The condition is then known as granular vulvitis, and is usually a result of septic or gonorrhœal infection. It is frequently associated with vaginitis.

Etiology.—The causes of catarrhal vulvitis may be roughly divided into those which come from above and those which come from below. In the first class are included inflammations or infections which extend downwards from the vagina or uterus, constant irritation by discharges coming from above, and constant wetting by ammoniacal or diabetic urine. In the second class are included such causes as dirt, constant scratching, masturbation, too frequent coitus, various traumatisms, parasites, and infection by the gonococcus and other septic organisms, or fungi.

Symptoms.—The symptoms of simple catarrhal vulvitis are a local sense of heat and burning, with a varying amount of pain, particularly after passing water, a more or less intense pruritus or itching, slight tumefaction, and a varying amount of serous, sero-purulent, or purulent discharge.

Gonorrhœal or septic vulvitis may be acute or chronic. In the chronic stage the symptoms are those just described, but usually in a more aggravated form. In the acute stage all these symptoms are more marked, and, in addition, there are the ordinary constitutional symptoms of septic absorption—rapid pulse, elevation of temperature, furred tongue, and general malaise.

Treatment.—Endeavour to remove the cause as far as possible, whatever it may be. Infection or inflammation higher up in the genital tract must be treated and cured. The consequences of wetting by urine can be avoided by the continued use of a greasy ointment, which prevents the urine from coming into contact with the skin, and by sponging the parts after passing water. In cases due to dirt, strict cleanliness must be enforced. Traumatic causes, such as scratching, masturbation, etc., must be stopped. If the cause is thus removed, the vulvitis can then be relieved and cured by the adoption of extreme cleanliness and the application of any mild ointment, as zinc ointment, ichthyol ointment, or hazeline cream, to the irritated part. If there is no discharge from above, a dusting powder, consisting of a mixture of

one part of oxide of zinc, one part of boracic powder, and two parts of starch powder, may be used instead of the ointment. The following prescriptions may also be found of use :—

R Zinci Oxidi, Bismutſſi Subcarb., āā 3ss Acidi Carbolici Liq., ℥ x Vaseline, ad 3j M. Ft. ung. (Wilson.)	R Resorcin, ʒij Acidi Salicyl., grs. vj Vaseline, ad 3j M. Ft. ung. (Ravogli.)
R Acidi Carbolici, 3ss Hydrarg. Sulphidi Rubri, grs. viij Sulphur. Sublim., ʒiij Ol. Bergamot., ℥ iv. Vaseline, ad 3j M. Ft. ung. (Lassar.)	R Zinci Oxidi, ʒij Calaminæ Pur., ʒiv Glycerini, ʒij Aquæ Rosæ, ad ʒviij M. Ft. lotio. (Wilson.)

In acute gonorrhœal cases, the patient must be kept in bed, and the parts repeatedly bathed with an unirritating antiseptic lotion. Iodoform powder may be dusted between the labia, and, if the condition is complicated by vaginitis, as is nearly always the case, the latter must be also treated.

II. EXUDATIVE VULVITIS.—Exudative vulvitis is the term applied to a vulvitis which is characterised by the appearance over the vulva of an exudate which is membranous or pseudo-membranous in character. It is identical in ætiology and character with exudative vaginitis, and rarely occurs except in conjunction with the latter.

III. PHLEGMONOUS VULVITIS.—Phlegmonous vulvitis is also of the same nature as phlegmonous vaginitis, and hence it is not necessary to discuss it separately. One of the most common examples of it is the condition known as *noma pudendi*, which is most likely to occur in children after acute fevers. *may be associated with or run on*

HERPES.

An eruption of vesicles on the external genitals, similar to those found in herpes of other parts, is occasionally met with. The eruption is usually found on the internal surfaces of the labia majora and minora, on the vestibule and the hood of the clitoris, and at the orifice of the urethra. More rarely, it is found on the external surface of the labia majora and on the mons veneris, while in a few instances it has been noticed on the cervix. The vesicles may occur singly or in one or more groups; they vary in size from a pin's head to a hemp-seed and contain clear serum. When they burst, they leave small superficial ulcers behind, which, unless they are infected by gonorrhœal or other organisms, heal rapidly. The diagnosis of herpes is easily made if the vesicles are unruptured; when, however, they are broken and nothing

left but groups of small ulcers, it may be difficult at once to distinguish between it and gonorrhœal or syphilitic ulceration. The herpetic ulcer is more superficial, rounder, and smoother at its base than is the syphilitic, while at the same time the discharge from it is less.

Treatment.—In the vesicular stage, all that is required is a mild saline purgative and the application of some cooling lotion or ointment to the herpetic patches. For the latter purpose, lead lotion or lead and opium lotion may be used with advantage. In the ulcerated stage, brushing the ulcers with a five to eight per cent. solution of nitrate of silver, followed by the application of Unguentum Oxidi Zinci, or any similar ointment, will hasten healing.

ECZEMA.

Eczema of the vulva is not an uncommon condition. It involves the labia and the clitoris, and may spread on to the mucous membrane of the lower part of the vagina, the adjacent skin of the thighs, and backwards over the perinæum to the anus. It may occur, as in other places, in an acute or chronic form—the latter being the more common. As predisposing causes to its occurrence, may be mentioned any local irritation which leads to scratching, undue friction by clothes, constant wetting by urine or vaginal discharge, and general want of cleanliness. The direct cause is the invasion of the deeper layers of the skin by the *Staphylococcus pyogenes albus*. In appearance, eczema of the vulva resembles eczema occurring in other places. It is, however, more difficult to obtain a complete cure here than elsewhere, on account of the difficulty of keeping the part dry.

Treatment.—All causes which tend to produce or to keep up irritation must be removed. For this purpose, vaginal douches may be administered in cases of vaginal discharge, and pathological conditions of the uterus or vagina should be cured. With the same object, tampons soaked in a ten per cent. solution of ichthyol in glycerine may be introduced into the vagina and removed after twenty-four hours. At the same time, a lotion containing carbolic acid (2 or 3 per cent.) or ichthyol (two drachms to the ounce) may be applied to the affected areas with the double object of sterilising the skin and of affording relief from the intense irritation which the eczema causes, or any of the numerous remedies, adopted in eczema of other parts, may be used instead. In eczema of the vulva, as in eczema of other regions, it is difficult to arrive at once at the particular liniment or lotion which will afford the best results, and it is necessary to watch closely the effect of whatever form is prescribed, and to change, or to continue, it according to the effect it produces. The following prescriptions may be found of use in different cases :—

Lotions.

℞ Acidi Carbolici, ʒj
 Glycerini, ʒij
 Alcohol, ʒij
 Aquæ Rosæ, ad ʒiv
 M. Ft. lotio.

(Ravogli.)

℞ Ichthyol, ʒij
 Olei Amygdalæ Dulcis,
 Aquæ Calcis, āā ʒiv
 Glycerini, ʒi
 Aquæ Rosæ, ad ʒijj
 M. Ft. lotio.

(Ravogli.)

Ointments.

℞ Acidi Salicylici, grs. x
 Zinci Oxidi,
 Pulv. Amyli, āā ʒij
 Vaseline, ʒss
 M. Ft. ung.

(Lassar's paste.)

℞ Resorcin, grs. x
 Zinci Oxidi,
 Pulv. Amyli,
 Lanolini,
 Vaseline, āā ʒij
 M. Ft. ung.

(Ihle's paste.)

Amongst other drugs which have been found of value, may be mentioned prepared calamine (15 grs. to the ounce of water), subacetate of lead, Liquor Carbonis Detergens (ʒj to the ounce of water).

PRURITUS VULVÆ.

The term pruritus vulvæ is used in two different senses. It is used to express itching or irritation about the vulva—a symptom of many different conditions, and it is used to express a definite condition of the external genitals in which there is intense itching without any obvious alteration of the skin.

The pathology of the latter condition was studied by Webster, and his researches show that though there is little or no change visible externally, there are extensive changes in the deeper layers of the skin. These changes are of the nature of a slowly progressing fibrosis, which affects principally the nerves and nerve endings of the clitoris and labia minora. The changes in the connective tissue are most marked in the corium under the papillæ, and are of the nature of a subacute inflammation. The cause of these changes is not known, but it is probably some form of persistent irritation such as results from the continued passage of diabetic urine over the skin. It is also probable that a general neurotic condition is an important predisposing cause. The symptoms are those of intense irritation, which forces the patient to scratch and even to tear the parts. In consequence of the abrasions of the skin caused in this manner, eczema usually follows.

Treatment.—If any obvious cause for the condition can be discovered, it must be removed. Relief of the irritation may be obtained by the use of the ointments and lotions which have been recommended in cases of vulvitis and eczema, especially perhaps by the use of glycerine

and ichthyol. Cold applications, such as lead lotion, are sometimes successful, as may also be sitz baths containing bran, or an alkali such as bichlorate of soda or carbonate of soda. The following baths are recommended by MacNaughton Jones:—(1) Bran bath:—bran, 2 lbs. ; potato starch, $\frac{1}{2}$ lb. ; gelatine, 1 lb. ; water at 100—105° F., 25—30 gallons. (2) Alkaline bath :—carbonate of soda, 2 oz. ; hypo-



FIG. 18.—Pseudo-elephantiasis. The external organs of generation of a woman, showing hyperplasia of the nymphæ and neighbouring parts. (*Roberts.*)

sulphite of soda, 2 oz. ; potato starch, 4 oz. ; water at 100—105° F., 25—30 gallons.

C. B. Ball has recommended a simple operative procedure in these cases. It consists in dissecting up flaps of the affected skin and then replacing them, the object being to sever the connection between the nerve endings in the skin and the nerves.

ELEPHANTIASIS.

Elephantiasis, as usually found in these countries, consists of a local hyperplasia of the skin and subcutaneous connective tissue, with blocking and dilatation of the lymphatics (*v.* Fig. 18). Round the growth are sometimes found ulcers, which may eat away the neighbouring structures. In some cases, the clitoris alone is affected. It is said that, when elephantiasis is met with in these countries, it is almost invariably associated with tertiary syphilis.

Treatment.—The only treatment of avail is excision of the affected tissue, beginning posteriorly and removing it piece by piece, the bleeding surfaces left by the removal of each piece being brought into apposition by sutures before removing the next piece, so as to limit as much as possible the hæmorrhage, which is always very free.

LEUCOPLAKIA.

Leucoplakia vulvæ or leucoplakic vulvitis has been carefully described by Berkeley and Bonney, who have drawn attention to the difference that exists between it and kraurosis vulvæ, and to its close connection with epithelioma of the vulva. We follow their description. Leucoplakia of the vulva is a chronic inflammatory condition characterised in its early stages by marked hyperæmia and cellular activity, and in its later stages by marked epithelial hypertrophy and a thickened, sclerosed, and retracted condition of the sub-epithelial tissues. It affects, in a well-marked case, the whole of the vulva, with the exception of the vestibule and the orifice of the urethra, which are said never to be affected. The disease may also spread laterally to the sides of the thighs, and posteriorly to the perinæum and the skin surrounding the anus. In the first stage, the parts affected are red, swollen, and excoriated, and their surface is dry. In the second stage, the labia minora decrease in size, and there is marked epithelial thickening, so that the parts may be said to undergo retraction with thickening. The colour of the affected area changes from red to white. In the third stage, the disease is most marked. Cracks and ulcers appear, the ulcers giving rise to a slight discharge, and bleeding sometimes when touched. At this stage, carcinoma frequently makes its appearance, starting, as a rule, in an ulcer or fissure. If this does not occur, a fourth stage follows, in which the vulva is smooth, shiny, and white, and the labia minora almost disappear owing to the contraction of the sub-epithelial tissue.

Symptoms.—The marked symptom of the first two stages is pruritus. In the third stage, this disappears, and is more or less replaced by pain and acute sensitiveness, owing to the exposure of nerve endings

in the floor of the ulcer or crack. In the fourth stage, the symptoms disappear, unless carcinoma has supervened.

Treatment.—The early treatment of leucoplakia consists in the relief of the pruritus, and this is often a most difficult matter. Berkeley and Bonney say they have obtained the best results with “zymocide lotion,” resinol ointment, and the use of X-rays. If these measures fail, and the disease proceeds to the third stage, excision of the affected area is probably positively indicated, on account of the great risk of the occurrence of epithelioma. If an epitheliomatous stage has actually occurred, then the treatment of the case is similar to that of epithelioma of the vulva, namely, free excision of the entire vulva and of the inguinal glands.

KRAUROSIS VULVÆ.

Kraurosis vulvæ (*κραῦρος*, dry; *vulva*) is the term applied to an atrophic condition of the external genitals and perinæum. The skin becomes smooth and shining, small subcutaneous hæmorrhages appear, and finally the parts become very pale, and look as if they had been ironed out. The microscope shows an increase of fibrous tissue, leading to compression of the vessels and nerves. The papillæ of the skin are small, and the sebaceous and sweat glands have disappeared.

Symptoms.—The symptoms may be slight, or may be very well marked. They consist in tenderness and irritability of the parts, causing pain on coitus, and pruritus. As the atrophy of the tissues becomes complete, the symptoms gradually disappear. If pregnancy occurs, very extensive laceration of the diseased structures may take place during parturition.

Treatment.—The treatment of this condition is most unsatisfactory, but sometimes complete removal of the atrophied tissue has been attended by favourable results. Application of the cautery to the tender spots (the seats of the subcutaneous hæmorrhages) has also been followed by relief.

. TUMOURS.

The true tumours, or neoplasms, met with in the region of the vulva may be benign or malignant.

I. BENIGN NEOPLASMS.—The benign growths are all of rare occurrence, and need only be enumerated:—

- (1) *Lipoma*, growing from the fatty tissue of the mons veneris and of the labia.
- (2) *Myxoma*, growing from the labia, or occurring as an extension downwards of a myxoma of the bladder.

- (3) *Angeioma*, growing from the blood-vessels. It is a very rare condition.
- (4) *Fibroma*, growing generally from the labia majora, but sometimes from the nymphæ or perinæum.
- (5) *Papilloma*, growing from any part of the vulva. It is generally multiple, and occurs as the result of irritating discharges coming from above, as in gonorrhœa.



● FIG. 19.—Carcinoma of vulva. C. Ulcerating growth.

- (6) *Neuroma*, growing from the vulvar nerves. Like angeioma, it is a very rare condition.
- (7) *Enchondroma*, growing from the clitoris, also a very rare condition.
- (8) *Adenoma*, growing usually from the labium majus or minus. It is a very rare condition.

II. MALIGNANT NEOPLASMS.

- (1) *Carcinoma*.—Squamous-celled carcinoma may be found on any part of the vulva, and not uncommonly starts in the clitoris. It

ulcerates freely, and involves the inguinal glands at an early stage (v. Fig. 19). It may be confused with inflamed papillomata, syphilitic ulceration, or lupus. If there is any doubt as to its nature, a small portion should be removed for microscopical examination. Carcinoma starting in the clitoris is usually a papillary, mushroom-shaped growth, ulcerated on the surface.

Cylindrical-celled carcinoma is a very rare condition. If it occurs, it

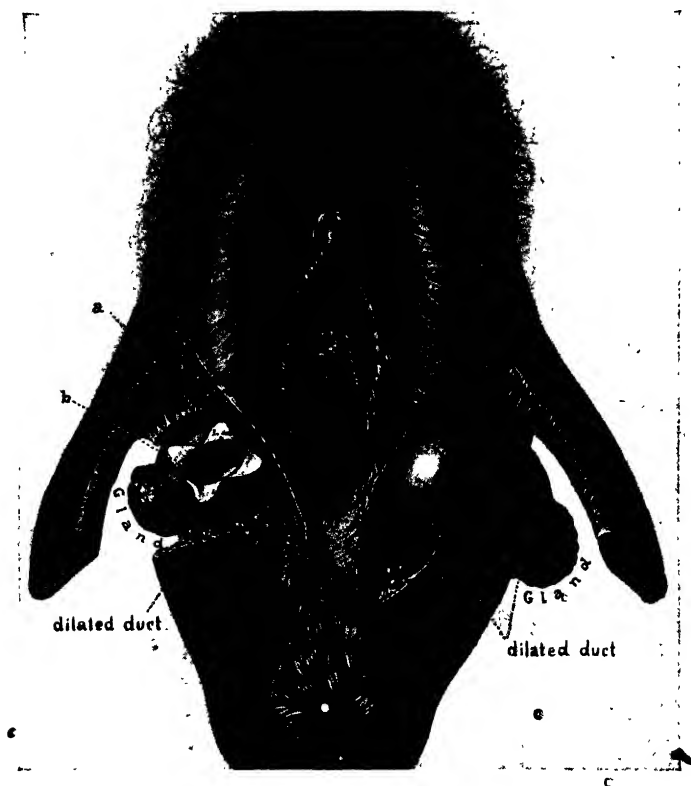


FIG. 20.—Cyst of Bartholin's duct. (Kelly.)

springs from Bartholin's gland and rapidly invades the neighbouring tissues.

Treatment.—If seen at a sufficiently early stage, the entire vulva should be extirpated (v. Figs. 21, 22), and with it the lower part of the vagina. The lymphatics passing from the vulva to the inguinal glands and the glands themselves must also be removed. If the growth is too advanced for this, treatment is directed towards checking the discharge as far as possible. This is best done by freely curetting away the growth and then cauterising its base with chloride of zinc or

the actual cautery. If there is much hæmorrhage, it can be checked by the application of plugs squeezed out of strong perchloride of iron. Radium treatment is also indicated in such cases.

(2) **Sarcoma.**—This is also very rare, and is usually of the melanotic variety and arises from the labium majus. It may begin in the clitoris.

In addition to the true tumours of the vulva, there are various false tumours or enlargements met with. They are as follows:—

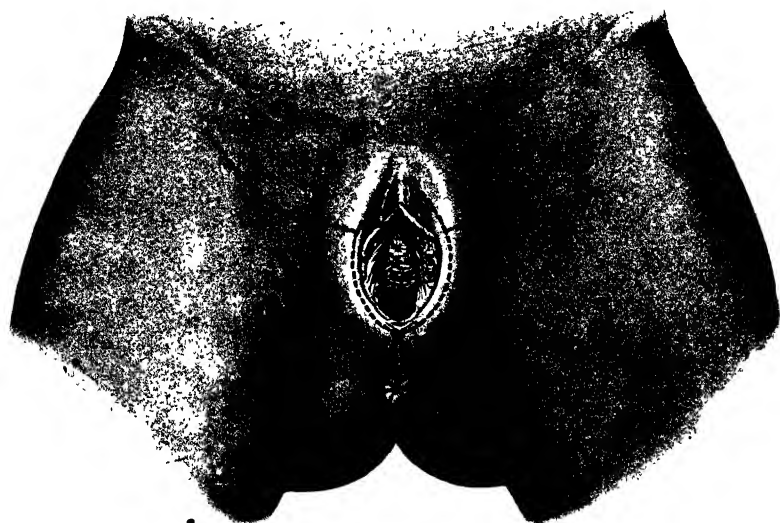


FIG. 21.—Excision of the vulva. The dotted lines show the position of the pubic incision, and of the secondary extension of the lateral incision.

- I. Hæmatoma.
- II. Retention cysts.
- III. Herniæ.
- IV. Hydrocele of the canal of Nuck.

I. **HÆMATOMA.**—Hæmatoma of the vulva is caused by the rupture of a blood-vessel in the connective tissue, which, owing to its laxity, favours the escape of blood amongst its fibres. Hæmatoma most usually occurs as a result of parturition, but may also be due to external violence. It first appears as a small, bluish, and elastic swelling, which gradually increases in size as more blood escapes into it. It may reach an enormous size, or burst, if left untreated.

Treatment.—The patient should remain at rest in bed, and cold

compresses be applied to the parts. If the swelling increases in size, it may be necessary to incise it, turn out the clots, and either close the cavity by means of sutures or plug it with iodoform gauze.

II. RETENTION CYSTS.—A retention cyst results from the obliteration of the duct of Bartholin's gland. It may form either in the dilated duct or in the gland itself (v. Fig. 20). It is found as an oval and tense swelling varying in size from that of a hazel-nut to that of an egg, and

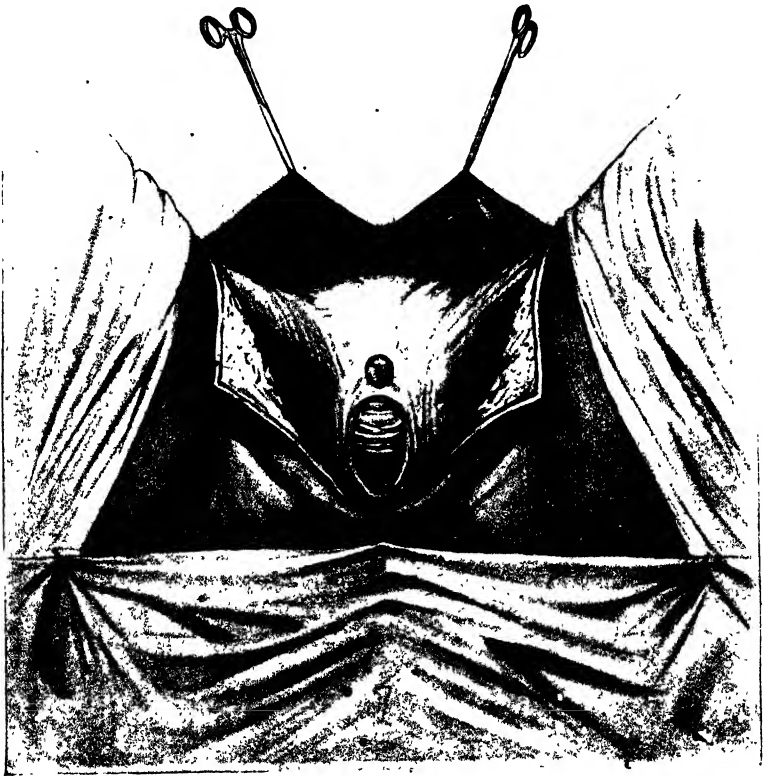


FIG. 22.—Excision of the vulva. The appearance of the wound after the removal of the necessary tissue.

containing a viscid fluid. Mucous and sebaceous retention cysts are also met with. They sometimes attain the size of a hazel-nut, and, in exceptional cases, may become even larger.

Treatment.—The usual treatment consists in excising the cyst completely. To do this an incision is made through the skin over the most prominent part of the cyst, and parallel to the labium. With the handle of the scalpel the cyst is then detached from the surrounding tissue, if possible without rupturing it. As soon as its margins have

been freed all round, it can be drawn outwards by seizing it in the fingers or in a dissecting forceps. Its attachments at the base are thus exposed, and form a kind of pedicle. This pedicle is tied and divided, and the cyst removed. The cavity left by its removal is closed—if not too large—by silkworm-gut sutures, passed transversely, and going completely below its base. If it is of considerable size, it must be closed by successive layers of buried catgut sutures. If the cyst has burrowed so deeply that its removal is dangerous or impossible, it is sometimes sufficient to make a free incision into it, evacuate its contents, and plug it firmly with iodoform gauze. If we have to deal with an abscess and not with a cyst, it is sometimes best to scrape out the gland with a sharp curette, instead of dissecting it out, and then to plug the resultant cavity with iodoform gauze. This gauze is removed and fresh gauze introduced daily, or every second day, until the cavity is obliterated. If sutures are used, they may be removed on the eighth day. Under such treatment the cavity usually eventually closes completely, but on the other hand a sinus may persist.

III. HERNIÆ.—Three forms of hernia are met with in these regions:—

- (1) *Inguinal Hernia*.—This is the term applied to herniæ which descend through the inguinal canal. They must be distinguished from hydrocele of the canal of Nuck.
- (2) *Labio-vaginal Hernia*.—This descends through the pelvic diaphragm anterior to the broad ligament. It is liable to be mistaken for cysts of Bartholin's gland.
- (3) *Perineal Hernia*.—This also descends through the pelvic diaphragm, but is posterior to the broad ligament.

IV. HYDROCELE OF THE CANAL OF NUCK.—A hydrocele of the canal of Nuck is the term applied to a collection of fluid in the pouch of peritoneum which follows the round ligament into the labium. It is not a condition of much importance, save that it may be mistaken for an inguinal hernia. It differs from the latter in having no impulse on coughing, and in not being affected by change of position, whereas an inguinal hernia tends to reduce itself when the patient lies down.

Treatment.—If the fluid is increasing, it may be drawn off with an aspirating needle, under careful asepsis. If the condition recurs, the sac should be exposed and dissected out, and the wound closed with a continuous catgut suture. If there is the smallest doubt as to the nature of the case, we should always cut down upon the swelling instead of aspirating it.

TUBERCULOSIS.

Tuberculosis of the vulva, or lupus, occurs in three forms :—

(1) A superficial form, characterised by the appearance of deep red patches, or of small prominences, varying in size from that of a lentil to that of a shilling. These coalesce and then ulcerate in the centre. The ulcerations extend in a serpiginous manner, and tend to heal at the older end of the track which they thus form, while the other or younger end is always advancing.

(2) A deep form, in which the ulcerations extend more and more deeply into the tissues rather than superficially.

(3) A hypertrophic form, in which there is marked increase in size of the affected parts, especially the labia majora and minora.

Treatment.—Destruction of the growth by the curette and actual or potential cautery, and complete excision with the knife, are the two most suitable forms of treatment. In addition every effort must be made to increase the patient's strength, as in other forms of tuberculous disease, and injections of tuberculin may be given with advantage at suitable intervals.

THE PERINÆUM.

The perinæum is the term applied to the cutaneous and subcutaneous structures lying between the posterior fourchette and the anterior margin of the anus. The only important pathological conditions met here are lacerations the result of labour. Such lacerations may involve only the posterior fourchette, or may extend so far back as to reach, or even involve, the anterior rectal wall. Lacerations extending beyond the fourchette should always be sutured immediately after delivery. If this is not done, or if after it has been done the torn edges do not unite, the condition known as chronic rupture of the perinæum occurs. This condition, which is frequently the precursor of uterine prolapse, will be discussed in the chapter on genital injuries.

CHAPTER V.

DISEASES OF THE VAGINA.

Vaginitis—Catarrhal Vaginitis; Pathological Anatomy, Ætiology, Symptoms, Treatment, Complications—Exudative Vaginitis; Symptoms, Treatment—Phlegmonous Vaginitis; Symptoms, Treatment—Emphysematous Vaginitis—Vaginismus; Ætiology, Symptoms, Treatment—Tumours; Benign Neoplasms—Malignant Neoplasms; Carcinoma, Sarcoma, Endothelioma—Vaginal Cysts—Hæmatoma—Traumata—Tuberculosis.

THE principal pathological conditions which are met with in, or in relation to, the vagina are as follows:—

Vaginitis.

Vaginismus.

Tumours.

Traumatic lesions.

Tuberculosis.

Congenital malformations of the vagina.

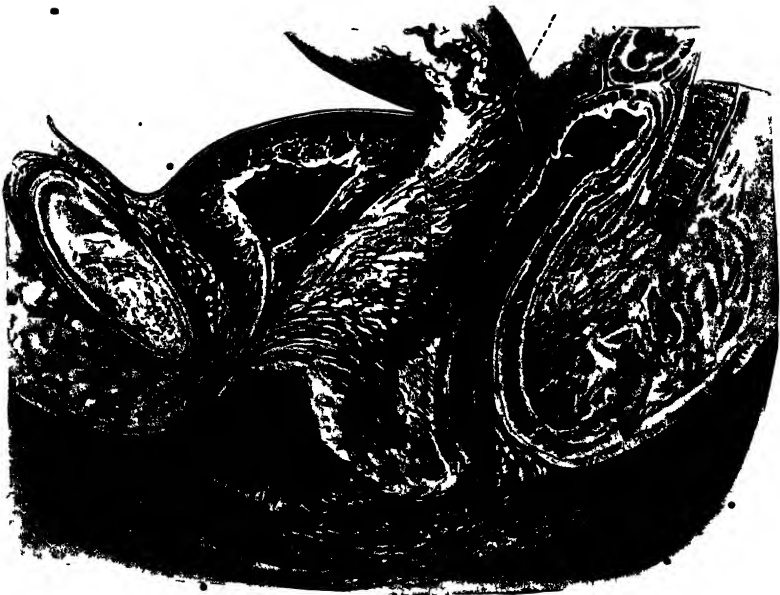


FIG. 23.—The anatomical relations of the vagina to the bladder and the rectum. *a.* Insertion of vaginal suspensory ligament. *b.* Insertion of the utero-sacra ligament. (From a dissection by Dr. C. Smyly.)

VAGINITIS.

Vaginitis is the term applied to any inflammatory condition of the vaginal mucous membrane or subjacent connective tissue.

Varieties.—The following varieties of vaginitis, classified according to their anatomical peculiarities, are met with :—

- I. Catarrhal.
- II. Exudative.
- III. Phlegmonous.

I. CATARRHAL VAGINITIS.—Catarrhal vaginitis is the most common variety of vaginitis with which we meet.

Pathological Anatomy.—In the earliest stage of catarrhal vaginitis, the papillæ of the vaginal mucous membrane become the seat of a small-celled infiltration. This causes them to increase in size, while the accompanying hyperæmia produces a more or less marked exfoliation of the epithelium. If only the superficial layers are thus thrown off the condition is known as *simple vaginitis*. If the inflammation is more severe, the papillæ continue to increase in size, and tend to coalesce, while their epithelial covering is almost or completely destroyed. As a result, the vaginal walls are covered with numerous small projections, which are seen under the microscope to consist of embryonic tissue. To this stage the name *granular vaginitis* is given. A third form of catarrhal vaginitis is met with under the name *senile or adhesive vaginitis*. In this form, the enlargement of the papillæ is not so marked as in granular vaginitis, but, on the other hand, the epithelium may be thrown off down to its deepest layer. As a result of this complete denudation, the vaginal walls become adherent to one another, and the canal may be partially or completely obliterated, or, if only isolated areas become adherent, bands are formed traversing the vagina in various directions.

Accordingly, we find that catarrhal vaginitis is met with under three clinical forms :—

- (1) Simple catarrhal vaginitis.
- (2) Granular catarrhal vaginitis.
- (3) Senile or adhesive catarrhal vaginitis.

Ætiology.—The causes of catarrhal vaginitis fall under two heads :—

- (1) Predisposing causes.
- (2) Exciting causes.

(1) Under normal circumstances, the vagina is lubricated by a fluid composed of a transudate of lymph serum and of desquamated epithelial cells. This fluid is acid in reaction, due to the presence of lactic acid, and is found to contain numerous rod-shaped bacilli—the

vagina or lactic acid bacillus—and *Monilia candida*, a non-pathogenic fungus which can only develop in the presence of the vagina bacillus. It is thin and opalescent, and is capable of preventing the development of saprophytic or pyogenic organisms. Pathological vaginal discharge, on the other hand, is alkaline or neutral in reaction, contains no vagina bacilli or monilia, but does contain swarms of saprophytic organisms, staphylococci, streptococci, and sometimes gonococci.

As it has been definitely proved that the normal vaginal discharge possesses powerful antiseptic properties, which properties are in the main due to the formation of lactic acid by the vagina bacillus, and as in all probability all forms of vaginitis are due to bacterial invasion, the predisposing causes of vaginitis must be looked for under the head of any condition which tends to neutralise or to render alkaline the normal discharge. The vaginal discharge can be made alkaline in three ways:—by the presence of blood; by increased serous transudation from the vaginal walls or uterus; or by the frequent removal of the acid-producing bacilli. The presence of blood in the vagina occurs physiologically during menstruation and the puerperium, pathologically as a result of uterine disease, new growths of the vagina, or traumas. Increased serous transudation may arise from some pathological condition of the uterus or adnexa, or from mechanical irritation of the vagina causing congestion of the mucous membrane or stripping of the epithelium. Such an irritation may result from badly fitting or too long worn pessaries, the presence of any foreign bodies, excessive coitus, or frequent vaginal examinations, etc. A gaping condition of the vulva is usually found as a predisposing cause of the mycotic form of simple vaginitis. The removal of the protective bacteria may be brought about by constant vaginal douching.

(2) The direct exciting cause of catarrhal vaginitis is undoubtedly the introduction of bacteria into the vagina. These bacteria may be introduced when any foreign body is passed into the vagina, or may travel upwards by direct extension from an antecedent vulvitis or cystitis, or downwards from an antecedent endometritis. In gonorrhoeal infection, which is the commonest cause of the severe forms of catarrhal vaginitis, the cocci in all probability lodge first in the epithelium of the cervix or of the urethra, as the compound squamous vaginal epithelium offers a greater bar to their invasion. They set up there a profuse catarrh, and, when this occurs in the cervix, the discharge pouring into the vagina overcomes the action of the vagina bacilli, washes away the superficial layers of the protecting epithelium, and so permits secondary infection in the deeper layers.

In addition to the gonococcus, the following forms of bacteria are found as causes of vaginitis:—Various forms of staphylococcus and streptococcus, bacillus coli communis, various forms of diplo-

coccus, saprophytic bacteria, and a diphtheroid bacillus. Various forms of fungi are also met with, which give rise to a form of simple catarrhal vaginitis known as mycotic vaginitis. The chief of these are oidium albicans and leptothrix vaginalis.

Symptoms.—The principal symptoms of simple vaginitis are a feeling of weight and pain in the pelvis, slight serous discharge, tenderness and heat of the genitals, and marked injection and hyperæmia of the mucous membrane. If the condition is due to the implantation of colonies of fungi, the vaginal walls are scattered over with white patches, as if flour had been dusted here and there over them. These patches are the colonies of the invading fungus.

In the granular form, the foregoing symptoms are very much more marked. The acute stage is characterised by extreme pain, swelling, and inflammation of the genitals, by profuse purulent discharge, by elevation of the temperature and pulse rate, and by the general symptoms of septic absorption. The symptoms of the chronic stage of granular vaginitis and of senile or adhesive vaginitis are very much akin. In both there is a feeling of weight and pain in the pelvis, accompanied by a burning sensation in the vagina. There is also a more or less profuse discharge, generally purulent in granular vaginitis, sometimes sanious in senile vaginitis.

Treatment.—In the acute stage of gonorrhœal vaginitis, it is often impossible to adopt any local treatment on account of the extreme tenderness. In such cases, all that can be done is to keep the patient at rest in bed, and, if possible, to administer vaginal douches. Such douches should be given at a temperature of about 90° F. and with a low pressure of water. If the patient can bear it, they should contain some unirritating antiseptic, but frequently it is only possible to use plain water. The usual antiseptics are:—cyllin (0·3 per cent.), carbolic acid (1 or 2 per cent.), and boracic acid (saturated solution). In addition to douching, pencils, or suppositories of iodoform may be placed in the vagina, also cotton-wool plugs soaked in a 10 per cent. solution of ichthylol in glycerine, or, in septic cases, a tampon of iodoform gauze. Pain can be relieved by hot compresses applied over the lower portion of the abdomen, by hot sitz-baths, and, if necessary, by means of opiates. As the acute stage passes off, the strength of the injections may be increased. Pyroligneous acid, sulphate of copper (20 grs. to the ʒj), nitrate of silver (5 to 10 per cent.), formalin (2 to 12 per cent.), lactic acid (3 per cent.), protargol (2 to 4 per cent.), may be applied through a cylindrical speculum. This speculum should always be the largest size that the patient can bear, in order to distend the vaginal walls as far as possible, and so allow the fluid to come more perfectly into contact with their entire extent. A saturated solution of boracic acid, or a weak solution of boro-glycerine.

or permanganate of potash, is the most suitable form of antiseptic in mycotic vaginitis.

Whenever vaginitis resists the usual treatment described above, a specimen of the discharge should be carefully obtained without contamination, and examined bacteriologically with the object of ascertaining the nature of the infecting organism. If a pure culture of an organism can be obtained, an autogenous vaccine should be made and administered in suitable doses. This treatment is particularly valuable in intractable "senile" vaginitis, which is often found to be due to some variety of staphylococcus or streptococcus in almost pure culture, or to the *bacillus coli communis*.

Complications.—Simple and adhesive vaginitis run a practically uncomplicated course; gonorrhœal vaginitis, on the other hand, is prone to give rise to the most serious complications. Of these the chief danger is the extension of the infection upwards, first into the uterine cavity, then into the tubes, and lastly into the pelvis, or the general peritoneal cavity. As a result of this extension, gonorrhœal endometritis, salpingitis (either with or without the formation of a pyosalpinx), abscess of the ovaries, pelvic peritonitis, and general peritonitis may occur. As remoter results of this extension, adherent retro-deviations of the uterus, fixed ovaries, tender and shortened posterior ligaments, and sterility from occlusion of the fimbriated extremities of the tubes may also occur. Other complications consist in infection of the bladder or even of the whole urinary tract, infection of the eyes, and the occurrence of gonorrhœal rheumatism.

II. EXUDATIVE VAGINITIS.—Under this head is included a membranous or pseudo-membranous inflammation of the vaginal mucous membrane. In the membranous form, the mucous membrane is the seat of a true diphtheritic inflammation, occurring either alone or in association with ordinary diphtheria, and usually found in association with diphtheritic vulvitis. In the pseudo-membranous form, the mucous membrane is the seat of a croupous inflammation, a condition which is most frequently met with after parturition as the result of septic infection. It also occurs after various eruptive fevers, as measles, scarlatina, and small-pox.

Symptoms.—In each form, the vagina is covered by a grey membrane, which can be readily detached in the pseudo-membranous form. There are usually extreme tenderness, and a profuse foetid discharge, high temperature, and the constitutional symptoms of septic or diphtheritic infection.

Treatment.—Frequent vaginal douches containing an unirritating antiseptic should be administered. In the septic form, the application of formalin (2 to 12 per cent.), followed by the plugging of the vagina

once or twice a day with iodoform gauze, is the best treatment. Iodoform pencils may also be introduced into the vagina, and the head of the patient's bed should be raised in order to facilitate the escape of the discharge. Here again the nature of the infecting organism should be ascertained, and a suitable vaccine administered.

III. PHLEGMONOUS VAGINITIS.—Phlegmonous vaginitis, or paravaginitis, is the term applied to that variety of vaginitis in which the infection has extended into the submucous connective tissue surrounding the vaginal canal. It may be septic or gonorrhœal in origin, or it may occur during the course of infective fevers, enteric fever, and pneumonia.

Symptoms.—The vaginal walls are indurated and perhaps cedematous, and fluctuation may be obtained in places, showing the presence of pus. The constitutional disturbances produced by septic absorption are well marked. The severity of the case depends upon the virulence of the infecting bacterium, and in some cases this may be so great as to cause the death of the patient. Fistulæ may result from extensive sloughing, and in very rare cases, when the inflammation extends all round the vagina, the latter may be detached and thrown off as a slough (Marconnat).

Treatment.—In the early stage, hot antiseptic vaginal douches should be given, and plugs soaked in glycerine and ichthyol may be placed in the vagina. If pus forms, it must be allowed to escape by means of free incisions. The patient's strength must be supported by administering plenty of nourishment, and by the use of stimulants when necessary. Vaccine treatment must also be adopted.

In addition to the foregoing forms, there is a condition known as emphysematous vaginitis. It cannot be called a definite variety of vaginitis, but it is sufficiently important to be mentioned. It is marked by the formation of small cysts, containing gas, under the mucous membrane of the vagina. It is a very rare condition, and as a rule only occurs in pregnant women. The cysts are met with in groups, and occur generally on the upper part of the anterior wall of the vagina. They convey a crepitating feel to the fingers, and the mucous membrane round them is somewhat inflamed. It is probable that the gas results from the presence of a gas-producing bacillus. There is no special treatment required, as the cysts usually disappear in a short time.

VAGINISMUS.

Vaginismus when first described was defined as "an excessive hyperæsthesia of the hymen and vulvar outlet, associated with such spasmodic contraction of the sphincter vaginæ as to prevent coition."

Ætiology.—In the great majority of cases, some local abnormality of the vulvar or vaginal orifice can be found to account for the vaginismus. In a small number, however, no such abnormality can be detected even on the most careful examination. Such cases are usually met with among hysterical patients. Amongst the local conditions which are found are vulvitis, vaginitis, atresia of the vaginal orifice, inflamed carunculæ myrtiformes, fissures, polypi, pro-lapse of the ovaries into Douglas' pouch, inflammation of the uterine appendages, cysts or abscesses of Bartholin's gland, and urethral caruncles.

Symptoms.—The most marked symptoms are extreme pain during any attempt at coitus (dyspareunia) and such spasmodic contraction of the vaginal muscle as to prevent coitus. On examination, it is sometimes found to be impossible to pass the finger into the vagina, both on account of the pain such an attempt causes and of the spasmodic contraction of the vaginal sphincteric muscles. If the cause of the vaginismus lies in some condition



FIG. 24.—Marion Sims' glass vaginal dilator for use in vaginismus.

which is situated below the vaginal sphincter, it can usually be easily determined. If, however, it lies above this, an anæsthetic must be administered.

Treatment.—If the cause of the vaginismus can be discovered, and if such cause can be removed, the patient as a rule will be cured. If no cause can be discovered, the treatment is very much more difficult. Vulvitis or vaginitis must be cured. • Inflamed carunculæ myrtiformes must be extirpated or destroyed with a cautery. An enlarged Bartholin's gland must be removed. Atresia of the vaginal orifice is best overcome by dilatation with Marion Sims' glass dilators (v. Fig. 24) after first incising the constricting tissues round the edge of the hymen. The dilator is worn for from three to six hours each day for a period varying from a week to a fortnight. If there is any difficulty in obtaining it, iodoform gauze may be used instead. Sometimes the cause cannot be discovered, and then it is consequently difficult to effect a cure. In purely neurotic conditions, sedatives may be tried and complete cessation from marital relations for a time. If this fails, relief may be obtained by the excision of the hymen, even though there is no apparent pathological condition present.

TUMOURS.

The true tumours or neoplasms which occur in the vagina are as follows :—

I. BENIGN NEOPLASMS.

(1) *Lipoma*, growing from the fatty tissue of the vaginal wall. It is a very rare condition.

(2) *Fibroma and fibro-myoma*, growing from the wall of the urethra and from the upper part of the vagina. These are also exceedingly rare, but sometimes occur as pedunculated or sessile growths.

II. MALIGNANT NEOPLASMS.

(1) *Carcinoma*.—Cancer of the vagina occurs as a primary condition, and as such is extremely rare. It is also found comparatively commonly as a secondary condition, due to extension of carcinoma of the cervix. Here we are only concerned with the primary condition.

Pathological Anatomy.—Primary carcinoma of the vagina may start from any part of the vaginal mucous membrane; most frequently, however, it begins either at the vulvo-vaginal junction or at the top of the posterior *cul-de-sac*. If it starts in the former situation, it involves the recto-vaginal septum, then invades the rectal wall, and finally causes a recto-vaginal fistula. If it starts in the latter situation, it rapidly spreads to the vaginal portion of the cervix. Clinically, it tends to assume one of two forms :—

(a) A vegetating or papillary form, which starts as a small papillary projection, grows out in masses resembling the cauliflower excrescences found in cancer of the cervix, and rapidly ulcerates.

(b) An infiltrating or nodular form, which starts as a small more or less circular area of infiltration, tends to grow in or beneath the epithelium instead of coming to the surface, and finally sends out papillary projections which ulcerate as in the previous form.

Symptoms.—The symptoms of primary malignant disease of the vagina, as of the cervix, are at first very ill defined. As a result these cases are rarely seen in time for operation. The patient first notices a blood-stained discharge, which gradually becomes more and more profuse. If the growth is sloughing, there is a profuse sanious discharge, and, if the ulcerative process opens any of the vaginal vessels, there may be serious hæmorrhage. The inguinal glands are early affected.

Treatment.—If the nature of the case is detected in time to afford any hope of a cure, complete excision of the vagina is indicated, and, as this destroys the passage from the uterus, a complete hysterectomy is also necessary. If the case is inoperable, temporary relief will be given by freely curetting away as much of the growth as possible, and then destroying with the actual cautery, or by the

application of strong caustics, the base of the ulcer so formed. Radium treatment is also indicated in these cases.

(2) **Sarcoma.**—Sarcoma of the vagina is even rarer than primary cancer.

Pathological Anatomy.—Vaginal sarcoma tends to assume one of two



FIG. 25.—Infiltrating sarcoma of the vagina.

forms:—an infiltrating form in which the growth tends to extend widely over the vaginal mucous membrane, or a circumscribed form in which the growth is more localised or even pedunculated. The latter form is the more common, and arises with slightly greater frequency from the anterior than from the posterior wall. As a rule vaginal sarcomata are spindle-celled, but round-celled, mixed round and spindle-celled, and giant-celled sarcomata also occur.

Symptoms.—The symptoms are almost identical with those of carcinoma. The growth spreads rapidly, and usually recurs after removal.

Treatment.—The treatment is similar to that of carcinoma of the vagina, namely, as complete an extirpation as possible.

(3) *Endothelioma.*—Endothelial tumours derived from the endothelial lining of lymph vessels sometimes occur in the vagina. They

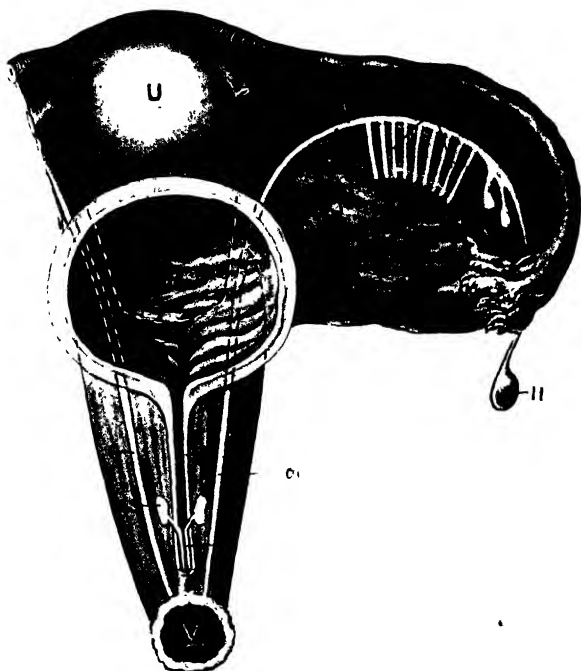


FIG. 26.—Diagram representing the foetal structures in the broad ligament and vagina in relation to the origin of parovarian and vaginal cysts. U. Uterus. B. Bladder. U. Urethra. S. Skene's ducts. V. Vagina. G. Gärtner's ducts. M.S. Max Schüller's glands. K. Kobelt's tubules. O. Ovary. R.L. Round ligament. H. Hydatis of Morgagni. P. Vertical tubes of parovarium.

are extremely rare tumours, and their treatment is identical with that of the other forms of vaginal malignant disease.

In addition to the true tumours of the vagina, various false tumours or enlargements occur. They are as follows :—

I. Cysts.

II. Hæmatoma.

I. **VAGINAL CYSTS.**—Cysts situated beneath the mucous membrane of the vagina and around the orifice of the urethra are frequently met. They vary in size from that of a hazel-nut to that of a full-term foetal head, but the smaller sizes are much the more common.

As a rule, they are confined to the para-vaginal tissue, but sometimes they extend upwards into the broad ligament, and when of large size they may extend so far into the abdomen as to simulate ovarian cysts.

Ætiology.—The ætiology of these cysts is still somewhat obscure. Five theories as to their causation have been brought forward :—

(1) That they are retention cysts due to the blockage of the duct of a gland.

(2) That they are due to the dilatation of lymphatic interspaces, in which case they would have an endothelial lining.

(3) That they are hygromata, that is, an accumulation of lymph between the connective-tissue cells, in which case they would have no lining membrane, either endothelial or epithelial.

(4) That the cysts are formed by the dilatation of one or other of two sets of embryonic ducts, which are found in relation to the vaginal wall. These are—the ducts of Gartner and the ducts of Skene. The former are the counterpart of the vasa deferentia in the male, and run downwards from the broad ligament beside the vaginal walls, one at each side. The latter open into two small depressions, one at each side of the urethral orifice, and are the counterpart of the prostatic ducts in the male (*v.* Fig. 26).

(5) That the cysts are due to the inclusion of a portion of vaginal mucous membrane amongst the tissues of the perinæum during the healing of a perinæal laceration.

It is probable that the last two theories explain the origin of most cases. If vaginal glands exist in the neighbourhood of the fornices, as some writers say, there is nothing to prevent retention cysts from forming in them, though it is improbable that such cases are numerous.

In addition to these cysts, there is another form met with, namely, cysts due to the implantation of echinococcus colonies. This form, in common with all instances of hydatid infection, is very rare in these countries. We have already referred to gas-containing cysts, the so-called emphysematous vaginitis.

Treatment.—The treatment of vaginal cysts resembles the treatment of vulvar cysts. If they are small and are not causing any symptoms they may be left alone, otherwise they should be removed. This is done by dissecting out the cyst wall, and then suturing up the resulting cavity. In the case of a large cyst which has extended downwards from the broad ligament, it may be necessary to open the abdomen to render its removal possible. If the cavity cannot be closed by suture after the cyst has been removed, it must be plugged with gauze.

Some writers recommend, in the case of a small cyst, to excise a portion of its wall instead of dissecting out the whole cyst. They claim that this method answers just as well and is safer.

II. HÆMATOMA.—Hæmatoma vaginæ may be met with as the result of a trauma occurring during parturition. It is a purely obstetrical complication, and accordingly will not be discussed here.

TRAUMATA OF THE VAGINA.

Traumata of the vagina are so closely associated with those of the perinæum and uterus, that they will be discussed together. Here it is only necessary to mention the fact that they sometimes occur.

TUBERCULOSIS OF THE VAGINA.

Tuberculosis of the vagina is a very rare affection. It is, however, sometimes met with either as a primary condition, or secondary to tuberculous disease of the vulva or uterus. It occurs as an irregular ulcer with sharply cut edges, its base covered by a caseous discharge. A final diagnosis can be made by examining this discharge for tubercle bacilli, or by examining microscopically a portion of the base of the ulcer.

Treatment.—If possible the ulcers should be freely excised. If this cannot be done, they may be destroyed by nitric acid or the actual cautery. As in the other forms of genital tuberculosis, treatment by tuberculin is of value.

CHAPTER VI.

DISEASES OF THE UTERUS.

Errors of Development: Congenital Absence of Uterus—Double or Bipartite Uterus; Treatment—Stenosis of the Cervical Canal; Symptoms, Treatment—Congenital Atrophy of the Uterus—Infantile Uterus—Congenital Atresia of the Cervix—Congenital Hypertrophy of the Cervix; Treatment; Operations: Dilatation of the Cervix—Division of the Cervix.

THE pathological conditions affecting the uterus will be considered under the following headings:—

Errors of development.

Displacements.

Traumatic lesions.

Inflammatory diseases.

Tuberculosis.

New growths.

ERRORS OF DEVELOPMENT.

Under the heading "Errors of Development" the following conditions are included:—

- I. Absence of (1) uterus, (2) ovaries, (3) uterus and ovaries.
- II. The various forms of double or bipartite uterus.
- III. Stenosis of (1) external os, (2) internal os, (3) entire cervical canal.
- IV. Congenital atrophy of the uterus.
- V. Infantile or foetal uterus.
- VI. Congenital atresia of the cervix, or of one side of a double cervix.
- VII. Congenital hypertrophy of the cervix.

I. CONGENITAL ABSENCE OF UTERUS, ETC.—Congenital absence of the uterus, or ovaries, alone, or of the uterus and ovaries, is a very rare condition. In some cases, it is accompanied by absence of the vagina as well. These conditions are only of diagnostic interest, as there is naturally no treatment of any avail.

II. DOUBLE OR BIPARTITE UTERUS.—The various forms of double or bipartite uterus are not of any great gynaecological interest. They only become of importance under certain circumstances:—

- (1) If they cause trouble during pregnancy or parturition.
- (2) If there is an atresia of any portion of the cervix or vagina on one or both sides, leading to retention of the menstrual products.
- (3) If they give rise to a difficulty in diagnosis.

Treatment.—The only case in which any question of treatment might arise would be in those cases in which there was a retention of the menstrual products. Such cases will be discussed under “Genital Atresiaë.”

III. STENOSIS OF THE CERVICAL CANAL.—Congenital stenosis (*στένος*, narrow) of the cervical canal, or of any part of it, is most usually the result of imperfect development of the uterus, and so is associated with acute ante flexion, as the latter condition is sometimes produced by imperfect development of the anterior uterine wall. Acquired stenosis may occur as the result of the improper use of caustics, or after a too extensive trachelorrhaphy, or amputation of the cervix. Although it is not the result of an error of development, we may refer here to its treatment.

If the cervical canal is of its normal size, there should be no difficulty in passing a sound 4 mm. in diameter into the uterus, if the sound is properly directed. If this cannot be done, a diagnosis of stenosis of that portion of the canal at which the obstruction is found is made.

Symptoms.—The chief symptoms of stenosis of the cervical canal are dysmenorrhœa and sterility. The dysmenorrhœa is usually worse at the beginning of the period, and becomes less as the flow is established. It is most probably due to the painful contractions of a uterus endeavouring to overcome the mechanical obstruction to the outflow of the menstrual products.

Sterility in all probability is caused by the endometritis which almost invariably accompanies stenosis.

Treatment.—The palliative treatment of stenosis consists in rest in bed during the menstrual period, the application of glycerine plugs to the cervix for a few days before the period is due, hot douches, sitz baths and the use of sedatives, as bromide of potash, hyoscine, morphia, chloral, etc. If these means fail, not alone to relieve the patient temporarily, but also to prevent the recurrence of the condition, the advisability of adopting radical treatment must be considered.

The form of radical treatment which is adopted depends upon the situation of the stenosis.* If the latter is situated at the os externum, bilateral division of the cervix, or, if the cervix is elongated, amputation of a portion of it is the best operation. If there is stenosis of the entire cervical canal, some form of posterior division is the best operation. These operations will be described later.

Acquired stenosis can usually be overcome by dilatation followed by plugging of the uterine and cervical canal with iodoform gauze. If this is not sufficient, posterior division should be performed.

It is always well to remember that, if any form of operative treatment is adopted in these cases, the uterus must be curetted as well, in order to cure the endometritis which is almost always present.

IV. CONGENITAL ATROPHY OF THE UTERUS.—In this condition, the uterus preserves its normal shape, but is very much smaller than usual, and its walls are very thin. The condition is found in those severe forms of chlorosis which are associated with congenital smallness of the heart and aorta.

The symptoms to which such a condition gives rise are amenorrhœa or scanty menstruation, and sterility. The diagnosis is made by means of a bimanual examination and by measuring the length of the uterus with the sound. Treatment is generally believed to be useless.

V. INFANTILE UTERUS.—In the condition known as infantile or foetal uterus, the uterus maintains permanently the shape which it normally possesses up to the time of puberty. That is to say, the cervix is abnormally long and thick, in comparison with the thin-walled and small uterine body. Conical cervix, and stenosis of a part or the whole of the cervical canal, are also frequent concomitants.

Ætiology.—The causes of non-development of the uterus are still under consideration, and require elucidation. In the past, it has been customary to attribute non-development to failure of development of the ovaries, but latterly there is an increasing tendency to consider that some of the other ductless glands are also largely responsible. It is believed that thyroid or pituitary insufficiency may cause the genital organs to remain infantile, while, conversely, it is known that persistence of the thymus glands has a similar effect.

Symptoms.—The symptoms which an infantile uterus causes are dysmenorrhœa, scanty menstruation, and sterility. The dysmenorrhœa is usually stated to be due to the compression of nerve filaments by an imperfectly developed uterine muscle and endometrium during menstrual congestion of the uterus. It may also be the result of the stenosis of the cervical canal and of the acute antelexion of the uterus, both of which are as a rule consequent on imperfect uterine development. Scanty menstruation is the natural result of the deficient blood supply of the uterus, while sterility is in all probability caused by an accompanying imperfect development of the ovaries.

Treatment.—The treatment of these cases, to be successful, must be undertaken early, and there is probably only a slight chance of influencing development after the age of twenty, although the effects

of non-development, such as cervical stenosis, may be removed by operative measures at any time. It is possible in some cases to increase uterine development by good food, tonics, and an open-air life. In other cases, benefit follows the use of thyroid extract and of pituitary extract. Extract of the whole gland should be prescribed in fairly large doses. Operative treatment is directed to overcoming the cervical stenosis, and sometimes to bringing the uterus out of a state of retroposition into a more normal position, and to stimulating the uterine body to promote development. The latter may be brought about by frequent hot intra-uterine douches, by plugging the cavity with iodoform gauze, and by faradisation with the negative pole of the battery inside the uterus, but, as a rule, all treatment is unsatisfactory.

VI. CONGENITAL ATRESIA OF THE CERVIX.—Congenital uterine atresia is a very rare condition. It will be described under “Genital Atresiaë.”

VII. CONGENITAL HYPERTROPHY OF THE CERVIX.—In congenital hypertrophy, the length of the cervix is as a rule principally affected, while its thickness remains comparatively unaltered. Elongation is due to a hyperplasia and hypertrophy of the muscle fibre and connective tissue of the infra-vaginal portion (*v.* Fig. 47), the mucous coat as a rule remaining unaffected. There is usually some degree of stenosis of the canal as well, and possibly backward displacement of the uterus.

Treatment.—Treatment consists in amputation of the hypertrophied portion. As a rule, it is sufficient to remove some of the overgrowth, as the involution, which follows on this, will cause the remainder to disappear.

OPERATIONS.

The following operations may be discussed here :—

- (1) Dilatation of the cervix.
- (2) Division of the cervix.

DILATATION OF THE CERVIX.

Dilatation of the cervix is perhaps the most frequently performed gynaecological operation. It may be carried out by measures which take several days to bring about the required result—*gradual dilatation*, or by measures which obtain the necessary dilatation in from three minutes to a quarter of an hour—*rapid dilatation*.

Indications.—Dilatation of the cervix is indicated in two classes of cases :—

- (1) As a preliminary to intra-uterine procedures, either diagnostic or curative, in order to obtain sufficient room to pass the necessary instruments through the cervical canal.
- (2) As a mode of treatment in stenosis of the cervix.

Rapid dilatation enables the cervix to be dilated to the size of a No. 8 to 10 Hegar's dilator, and as this size is quite sufficient for curetting, it is the form of dilatation indicated for this purpose. Gradual dilatation enables us to obtain a much greater degree of dilatation of the cervical canal without any danger of laceration of its muscular walls. Consequently it is the form of dilatation

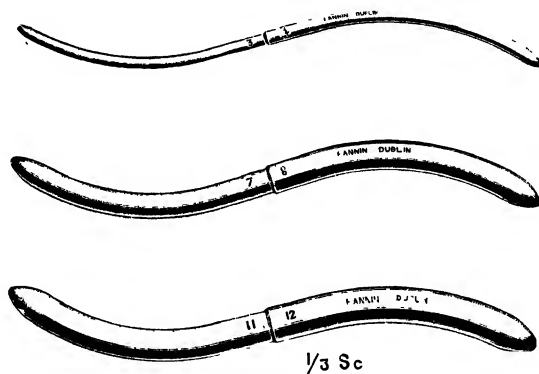


FIG. 27.—Graduated dilators for cervical dilatation.

indicated when we require to dilate the cervix above the size of a No. 10 Hegar.

Instruments.—For gradual dilatation of the cervix, the following instruments are required :—A posterior speculum, two American forceps, a sound, sea-tangle tents, Bozemann's catheter, iodoform gauze, and a set of graduated dilators (v. Fig. 27). For rapid dilatation, the same instruments are required with the exception of the tents and the gauze.

Operation.—We must consider the two methods separately.

Rapid Dilatation.—Rapid dilatation is accomplished by means of Hegar's graduated dilators in the following manner :—Pass a posterior speculum, seize the anterior cervical lip in one American forceps and the posterior in another, and draw the uterus down as far as possible (v. Fig. 28). Then pass the sound into the uterus in order to ascertain the length and the direction of its cavity, and wash the cavity out by means of a Bozemann's catheter. Next, push through the inner os the largest-sized dilator which will pass. This, as a rule is about

No. 4. Allow it to remain in position for a moment, then withdraw it and pass the next larger size, then the next, and so on until it

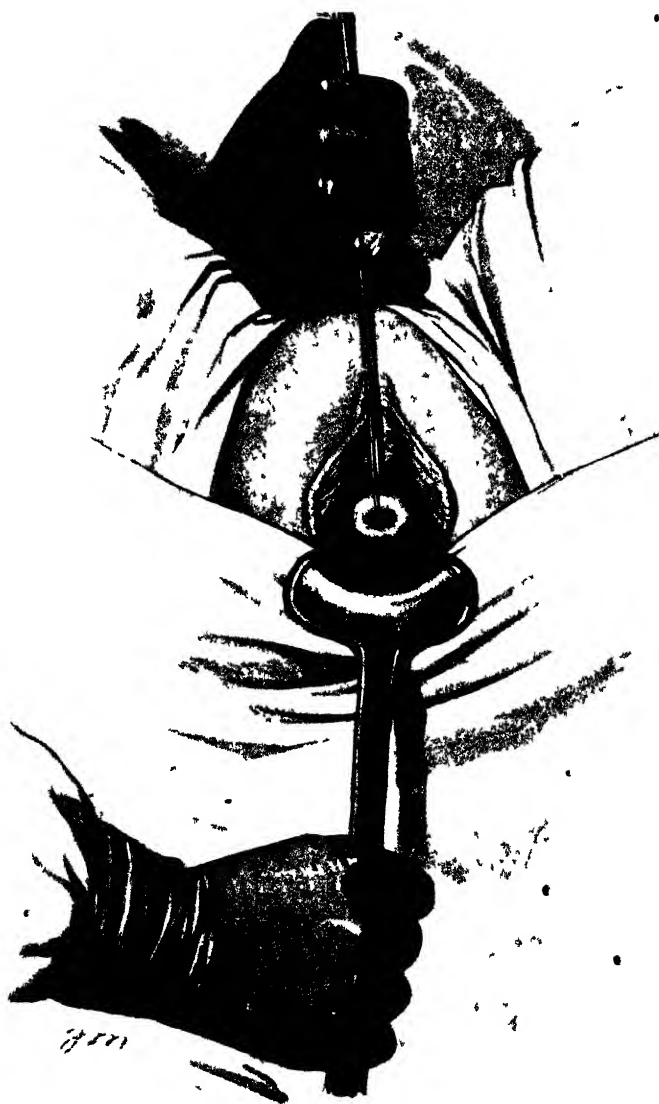


FIG. 28.—The position and arrangement of the patient in vaginal operations.

is apparent, by the amount of resistance experienced, that the passage of a larger dilator would cause a laceration. It will facilitate the passage of the dilators if they are first placed in a basin of warm lysol solution.

Gradual Dilatation.—Gradual dilatation is the method indicated when dilatation above the size of a No. 8 or No. 10 Hegar's dilator is necessary. It can be obtained in three ways, as has already been mentioned; they are as follows:—

- (1) By sea-tangle tents. This is the method most commonly employed.
- (2) By hydrostatic dilators. This form of dilator is never used in gynæcological practice.
- (3) By the introduction of a succession of firmly applied intra-uterine tampons of iodoform gauze. Each tampon is allowed to remain in the uterus for twenty-four hours, and the process as a rule requires to be performed some six or eight times to obtain the necessary dilatation.

In order to obtain the maximum amount of dilatation of the cervix, both rapid and gradual dilatation must be adopted. In such cases begin by dilating the cervix with Hegar's dilators as far as is possible without causing laceration, *i.e.*, up to about a No. 8 or No. 10. As soon as this point is reached, further dilatation by means of Hegar's dilators should cease, and as many sea-tangle tents as the cervix will hold, using small tents in preference to large ones, are passed into the cervix, taking care that they project slightly through the inner os into the uterine cavity. These tents are allowed to remain in position for twenty-four hours, and are then removed. The cervix is again dilated with Hegar's dilators up to No. 23 to 25, and a fresh set of tents is inserted and allowed to remain in position for a further period of twenty-four hours. At the end of this time, the cervix is usually sufficiently dilated for any procedure. If, however, owing to its great rigidity, it is not sufficiently dilated, a fresh set of tents is again inserted. Each time the tents are inserted, a light tampon of iodoform gauze is placed in the vagina, with the object both of guarding the mucous membrane from injury and of preventing decomposition.

After-treatment.—The patient should always remain in bed for a few days after dilatation has been performed. No special after-treatment is necessary other than that proper to whatever operation has been performed.

DIVISION OF THE CERVIX.

Division of the cervix is performed with the object either of increasing the size of the cervical canal, or of widening the angle of flexion between the axes of the cervical canal and of the body of the uterus. It is an operation which is sometimes of considerable value, as it brings about the relief of dysmenorrhœa or the apparent cure of sterility, and in such cases its performance is justified by its results.

It is, however, none the less true that it produces a pathological condition closely resembling that caused by tearing of the cervix during labour, *i.e.*, an exposure of the mucous membrane of the cervix to the action of the vaginal discharge and the vaginal micro-organisms. In consequence it not infrequently leads to such after-symptoms as leucorrhœa and pelvic pain, and then on examination of the cervix a condition of ectropion may be found. Consequently, a second operation may be required to cure the ectropion. In spite of this, however, division of the cervix is quite permissible and advisable when there are clear indications for its performance.

Indications.—Division of the cervix may be indicated under the following conditions :—

- (1) Acquired or congenital stenosis of the cervical canal.
- (2) Acquired or congenital acute antelexion of the uterus.

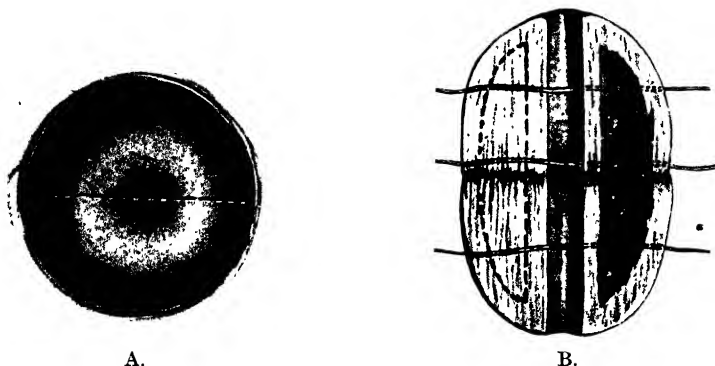


FIG. 29.—Bilateral division of the cervix. A. Line of incision. B. Result of incision, sutures in position on one side. Excision of a boat-shaped piece to facilitate the adaptation of the mucous edges.

Instruments.—The instruments are the same as those required for amputation of the cervix.

Operations.—Division of the cervix can be performed in two different ways, according to the direction in which the cervix is divided :—

- (A) **Bilateral division**, in which the cervix is divided into an anterior and posterior lip by a transverse incision.
- (B) **Posterior division**, in which a single incision is made vertically in the middle line of the posterior lip.

(A) **Bilateral Division.**—Bilateral division of the cervix is the easier of the two methods of division. The anterior and posterior lips are seized with American forceps, and the cervix drawn well downwards. With a scalpel or stout scissors, the cervix is split transversely, as is done in the first stage of Schroeder's amputation operation (*v.* Fig. 29, A). The incision is carried upwards as far as possible

without cutting into the tissues of the vaginal vault. The final step consists in suturing the mucous membrane of the cervical canal to the mucous membrane covering the outside of the cervix. This is done by three sutures at each side, as shown (*v.* Fig. 29, B). Bilateral division, however, tends to produce even a greater degree of ectropion than does posterior division, and on that account is now very seldom performed. Further, it is only of use when the cervical stenosis is limited to the region of the os externum, as the incision does not reach sufficiently high to be of use in stenosis of the internal os.

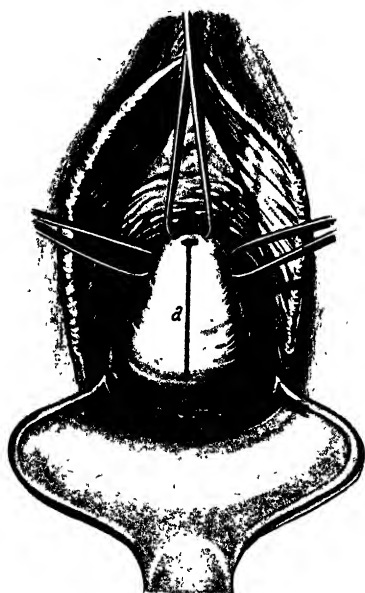


Fig. 30 —Posterior division of the cervix. *a.* Line of incision.

(B) **Posterior Division.**—Posterior division of the cervix has two advantages over bilateral division. First, it does not cause as much eversion of the cervical mucous membrane, and, secondly, it is possible to carry the incision sufficiently high to reach the internal os. The operation of posterior division is usually carried out as follows:—Expose the cervix and seize the posterior lip with two American forceps, one a little to each side of the middle line. A narrow scalpel is then passed into the canal, and by cutting from within outwards, and from the external os upwards, the posterior lip is divided in the middle line up to the vaginal vault (*v.* Fig. 30). Then, by carrying the point of the scalpel up to the internal os, the fibres of the latter also can be divided in the middle line. This incision,

however, must only extend through half the thickness of the cervical tissue, as, if it traversed the entire thickness, it would emerge above the line of posterior peritoneal reflection. Two sutures are then passed, one at each side, and as near the level of the internal os as possible, with the object of bringing the mucous membrane which lines the cervical canal into contact with the mucous membrane which covers the cervix. Each suture is of stout silkworm-gut, and is passed with a small whole-curved needle which is entered at one side of the incision through the mucous membrane lining the cervical canal as high as can be reached, and made to emerge at a corresponding

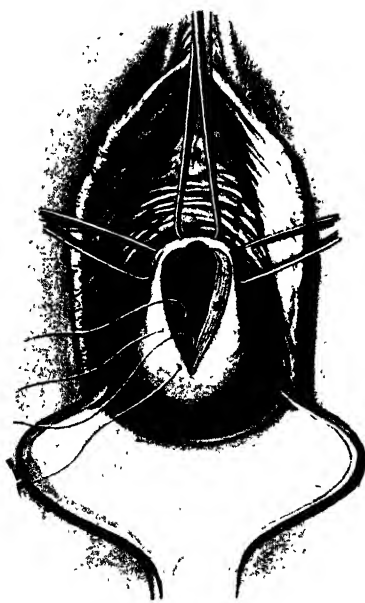


FIG. 31.—Posterior division of the cervix. Result of incision, sutures in position on one side. *a.* Cut edge of posterior lip.

point in the mucous membrane covering the cervix (*v.* Fig. 31). A similar suture is then passed at the opposite side of the incision, and both are tied across the face of the cut surface, in such a manner as to bring the lining and covering mucous membranes of the cervix into contact. If necessary, a third and a fourth suture are introduced, one at each side below the former sutures.

There is a simple and extremely useful modification of this operation by means of which no raw surface is left to heal by granulation, as almost always happens in the ordinary posterior division. It is performed as follows:—The anterior lip of the cervix is seized with a forceps in the middle line, and the posterior lip is divided as has

been just described (*v.* Fig. 30). In this way, two raw are obtained which run the length of the vaginal cervix. The centre of both these raw edges is then caught in a forceps and drawn apart laterally, with the result that the space between the edges becomes lozenge-shaped, and the os externum tends to approach the posterior fornix (*v.* Fig. 32, A). Two sutures, one at each side, are then passed, with the object of drawing the os externum up to the top of the fornix, and of turning the original vertical incision into a transverse one, in the centre of which will be the new os externum.

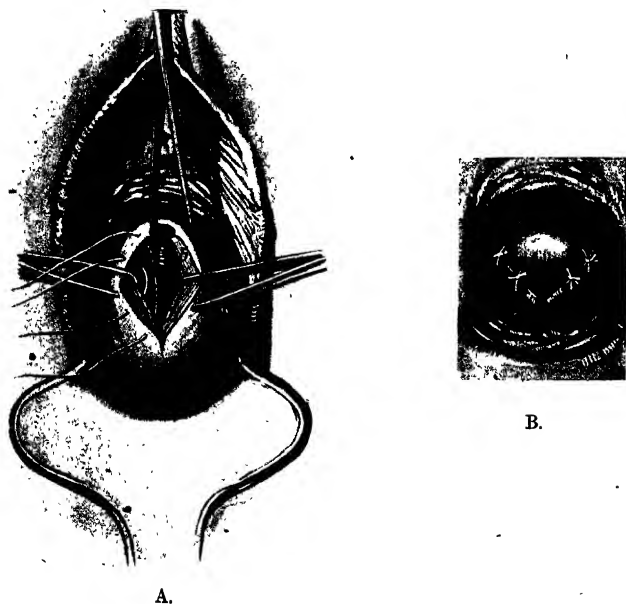


FIG. 32.—Dudley's posterior division. A. The manner in which the cervix is drawn apart after division, and in which the sutures are inserted. *a'*, *a* and *b'*, *b*. Cut surfaces of posterior lip. B. The sutures tied. Letters as before.

The passage of these sutures is the only troublesome part of the operation. A small curved needle, threaded with silkworm-gut, is entered through the covering mucous membrane of the cervix at one side, and as near the top of the incision as possible. It emerges through the mucous membrane of the cervical canal, and is again passed from within outwards through the cervical tissue of the same side, and as close as possible to the tip of the cervix (*v.* Fig. 32, A). A similar suture is then passed through the opposite side of the cervix. If necessary, a second suture may be passed at each side. When the sutures are tied, the os externum is drawn up to the vaginal vault, and each raw surface

is folded over on itself, so causing its complete disappearance (v. Fig. 33, B). The steps and result of the operation will be more easily understood by reference to the diagrams.

After-treatment.—The uterus and vagina are plugged lightly with iodoform gauze. Both plugs are removed on the evening of the second day. The patient may be allowed up in from eight to ten days. and the sutures are to be removed on the twenty-first day.

CHAPTER VII.

DISEASES OF THE UTERUS (*continued*).

Displacements of the Uterus. Terminology—Normal Position of the Uterus—Table of Displacements—Upward Displacement—Downward Displacements—Backward Displacements; Retroversion and Flexion; Retioposition—Forward Displacements; Anteversion and Flexion; Anteversion—Lateral Displacements of the Uterus: Dextro- or Sinistro-version or Flexion—Torsion—Inversion: Degrees, Varieties—Acute Inversion—Chronic Inversion.

DISPLACEMENTS OF THE UTERUS.

The Terminology of Uterine Displacements.—There are certain terms in common use to describe the various positions of the uterus, and these must be clearly understood. The first two of these are the terms *version* and *flexion* of the uterus. In order to understand these

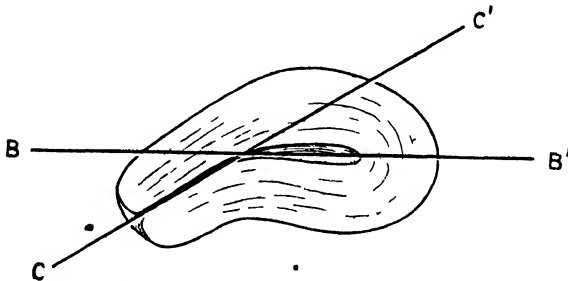


FIG. 33.—Diagram of the uterus showing the axes of the body and cervix. B B'. Axis of body. C C'. Axis of cervix..

terms the uterus must be considered as consisting of two parts or segments,—a Body, and a cervix, each of which has a longitudinal axis (v. Fig. 33). In consequence of the somewhat lax attachments of the lower segment, *i.e.*, the cervix, to the surrounding parts, its axis has a considerable range of motion, so that it can move through some 180 degrees, as is shown in the accompanying diagram (v. Fig. 34). Also, as a result of the flexibility of the uterine muscle at the junction of the two segments, the axis of the body can adopt different positions in regard to the axis of the cervix (v. Fig. 36). By *version*, is meant the turning of the axis of the cervix away from the vertical (v. Fig. 34). If the axis is vertical, version is absent; if it is inclined forwards, the uterus is said to be in a position of anteversion; if backwards, of retro-

version ; if to the right, of dextroversion ; and if to the left, of sinistroversion (*v.* Figs. 34 and 35). By *flexion*, is meant a bending of the axis of the body away from the axis of the cervix, and the term is again

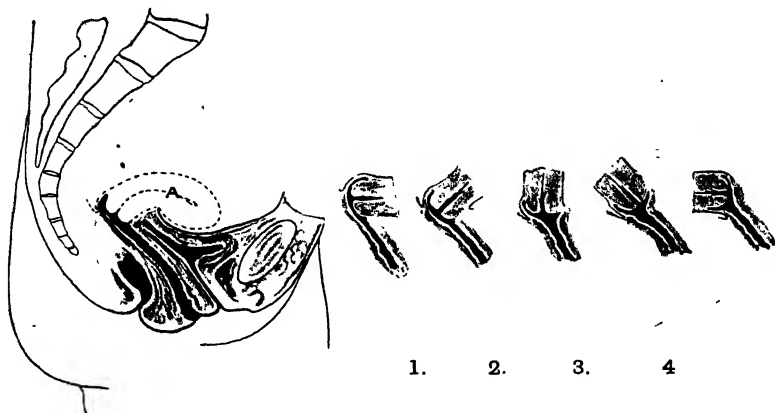


FIG. 34.—Diagram showing the different versions of the cervix in an antero-posterior plane. 1. Complete anteversion. 2. Slight anteversion. 3. Vertical position. 4. Slight retroversion. 5. Complete retroversion.

qualified by the same prefixes as is version—anteflexion, retroflexion, sinistroflexion, and dextroflexion (*v.* Figs. 36 and 37). It is not necessary that both flexion and version should occur in the same direction. As will be seen in the diagram, a uterus may be retroverted and ante-

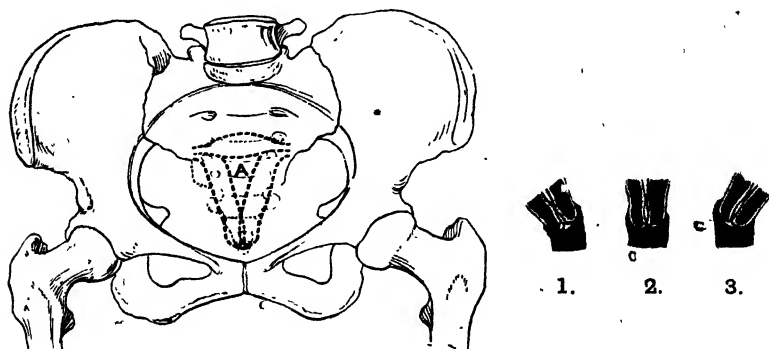


FIG. 35.—Diagram showing the different versions of the cervix in a lateral plane. 1. Dextroversion. 2. Vertical position. 3. Sinistroversion.

flexed, or *vice versâ*, or it may be dextroverted and sinistroflexed, or *vice versâ* (*v.* Figs. 36, 10, 11, and 37, 8, 9). In such complex displacements, the flexion is considered to be the more important, and in whatever direction it takes place, the uterus is said to be displaced.

The following paragraphs state briefly the terms applied to the various

positions which the uterus may assume so far as flexion and version are concerned, and may be of assistance in enabling the student to understand more clearly these somewhat puzzling terms.

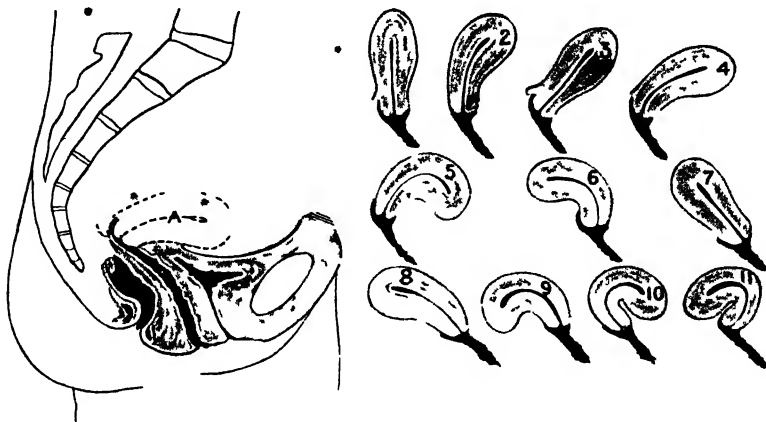


FIG 36.—Diagram showing the different positions of the uterus in an antero posterior plane 1 Vertical position 2 Slight ante flexion alone 3 Ante version alone 4 Ante version and slight ante flexion 5 Ante version and marked ante flexion 6 Retro flexion alone 7 Retro version alone 8 Retro version and slight retro flexion 9 Retro version and marked retro flexion 10 Retro version and ante flexion 11 Ante version and retro flexion

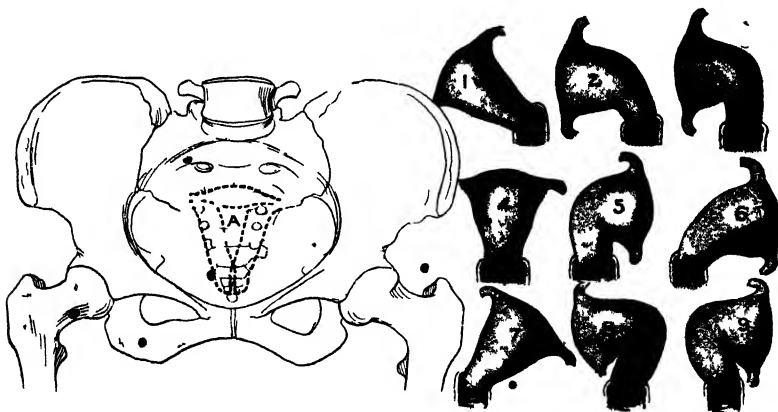


FIG 37.—Diagram showing the different positions of the uterus in a lateral plane 1. Dextro version alone 2 Dextro version and dextro flexion 3 Dextro flexion alone 4. Vertical position 5. Sinistro flexion alone 6 Sinistro version and sinistro flexion. 7. Sinistro version alone 8 Sinistro version and dextro flexion 9. Dextro version and sinistro flexion.

(1) When the body and cervix of the uterus are in a line which is vertical, the uterus may be regarded as being in a position neither of version nor of flexion (v. Figs. 36, 1, and 37, 4).

(2) When the body and the cervix of the uterus are in a line which

is turned away from the vertical, the uterus is said to be ante-, retro-, dextro-, or sinistro-verted according to the direction in which they are turned. As they are in a line, there is no flexion (*v.* Figs. 36, 3, 7, and 37, 1, 7).

(3) When the cervix is vertical, and the body is bent away from it, the uterus is said to be ante-, retro-, or latero-flexed according to the direction in which the body is bent. As the cervix is vertical, there is no version (*v.* Figs. 36, 2, 6, and 37, 3, 5).

(4) When the cervix is turned away from the vertical and the body and cervix are not in a line, the uterus is said to be ante-, retro-, dextro-

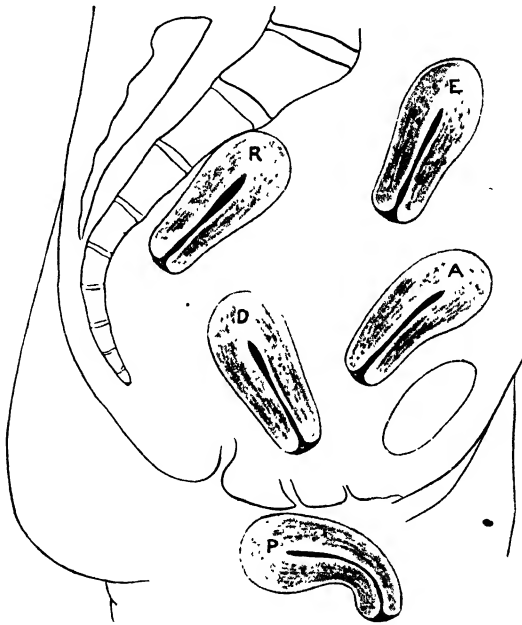


FIG. 38.—Diagram representing some uterine displacements. E. Ascent. A. Anteposition. D. Prolapse. R. Retroposition. P. Procidentia.

or sinistro-verted and ante-, retro-, dextro-, or sinistro-flexed according to the direction in which both axes are respectively inclined (*v.* Figs. 36, 4, 5, 8, 9, 10, 11, and 37, 2, 6, 8, 9).

It will be seen that, with the exception of the complex displacements such as associated retroversion and antelexion, these displacements can be divided into three main groups:—

- (1) Backward displacements.
- (2) Forward displacements.
- (3) Lateral displacements.

In the first group are included retroversion, retroflexion, and associated retroversion and retroflexion. In the second group are

included anteversion, anteflexion, and such degrees of associated anteversion and anteflexion as are pathological. In the third group are included dextro- and sinistro-version, dextro- and sinistro-flexion, and associated latero-version and flexion.

Complex displacements are usually of importance on account of the flexion present, and so may be included, for the sake of convenience, in one or other of these groups according to the direction of the flexion.

If the uterus is displaced *en bloc* in any direction in a horizontal plane, it is spoken of as *-posed*, with the addition of whatever prefix expresses the direction in which it has been displaced,—anteposed, retroposed, dextroposed, sinistroposed (*v.* Fig. 38, A, R).

If the uterus is displaced in a vertical direction, it is spoken of as *ascent* when it is displaced upwards, *descent* when it is displaced downwards (*v.* Fig. 38, E, D, P). There are two degrees of the latter. Descent of the uterus is known as *prolapse* so long as the uterus does not leave the vagina, it is known as *procidentia* when the uterus is protruding from the vulva (*v.* Fig. 38, D, P).

If the uterus, as a whole, is twisted upon its long axis, either to the right or to the left, the condition is known as *torsion*, with the suitable prefix. Thus we may have dextrotorsion or sinistrotorsion.

If the uterus is turned inside out, so that its mucous lining lies outside of and below the cervix, the condition is known as *inversion* (*v.* Fig. 63).

We may now enumerate in tabular form the various displacements which are met with:—

Upward displacement	. Ascent.
Downward displacement	{ Prolapse. Procidentia.
Backward displacement	{ Retro-version, or -flexion. Retroposition.
Forward displacement	{ Ante-version, or -flexion. Anteposition.
Lateral displacement	{ Dextro- or sinistro-version or -flexion Dextro- or sinistro-position.
Torsion	. Dextro- or sinistro-torsion.
Inversion	{ Incomplete. Complete.

The Normal Position of the Uterus.—Before beginning to study the abnormal positions of the uterus, it is necessary to understand clearly what is the normal position of this organ. If we understand that the uterus is a mobile organ, and that all its positions—normal or abnormal—are the result of the forces—physiological or pathological as the case may be—which act upon it, and if we discover what the

physiological forces are, there will not be any difficulty in determining what are, and what are not, the normal positions of the uterus.

First, what is the normal degree of mobility of the uterus? The relations of the uterus are such that it is enabled to rotate in a sagittal mesial plane following the arc of a circle whose centre is situated about the cervico-vaginal junction. At the same time, the consistence of the fibres of the uterine isthmus is such that the body can bend under the influence of any slight force—such as its own weight—in such a manner that its axis, instead of coinciding with that of the cervix, is inclined to the latter at a varying angle (v. Fig. 39).

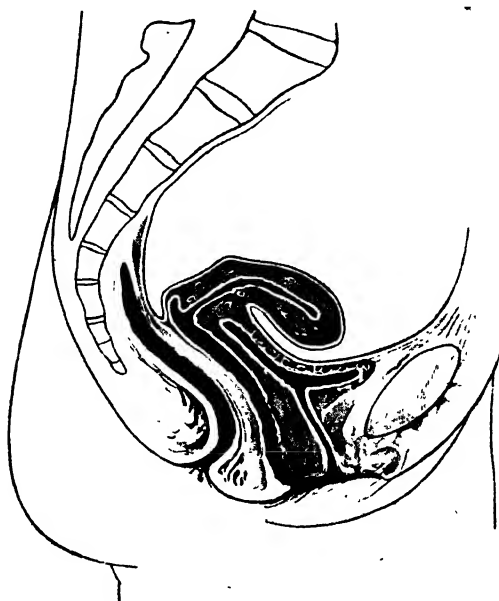


FIG. 39.—Diagram representing the normal position of the uterus in virgins.

Secondly, what are the physiological factors which act upon the uterus? The factors which unite to keep the uterus in its normal position are :—

- (1) The uterine ligaments.
- (2) The vaginal attachment.
- (3) The weight of the uterine body.
- (4) The intra-abdominal pressure.
- (5) The resistance of the pelvic floor and bladder.

(1) *The Uterine Ligaments.*—The important ligaments of the uterus are eight in number, and are arranged in pairs. The two posterior or utero-sacral ligaments contain muscle-fibres, and run from the lateral aspect of the supra-vaginal portion of the cervix to the sides of the

second sacral vertebra. When they contract, they pull the upper part of the cervix backwards, and so tend to keep the centre of gravity of the body in front of the cervix, and the uterus in a position of anteversion. They are also an important factor, if not the most important factor, in maintaining the cervix at its normal height in the pelvis. The two round ligaments also contain muscle-fibres. They run from the cornua of the uterus along the face of the broad ligaments to the internal abdominal rings. There they pass from the peritoneal cavity into the inguinal canals, and are finally lost at the external abdominal

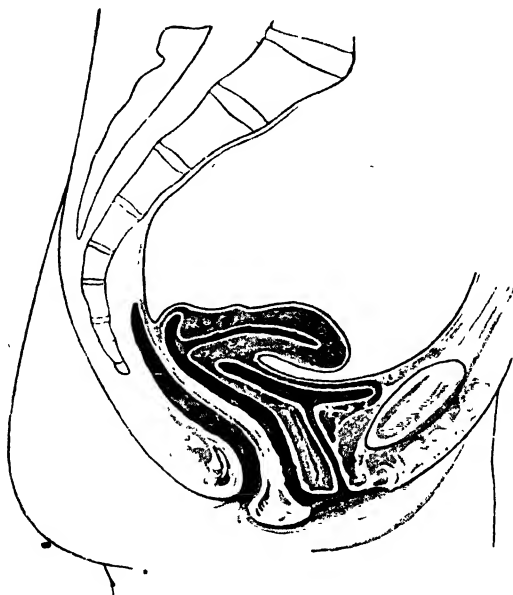


FIG. 40.—Diagram representing the normal position of the uterus in women who have borne children.

rings. The effect of their contractions is to pull the fundus forwards. The two broad ligaments pass from the sides of the uterus laterally outwards to the pelvic walls. They are normally lax and do not exert much influence on the uterus, but their tendency is to keep it moored in a sagittal mesial plane. The lateral ligaments of the cervix, or Mackenrodt's ligaments, are fibrous bands inserted laterally into the cervix and upper part of the vagina. They assist the utero-sacral ligaments in maintaining the cervix at its normal height, and they also moor the cervix and lateral vaginal fornices in a sagittal mesial plane. Both the lateral and the utero-sacral ligaments are specialised bands formed from the endo-pelvic fascia.

(2) *The Vaginal Attachment.*—The upper part of the vagina is very



FIG. 41.—The broad and round ligament on the right side.

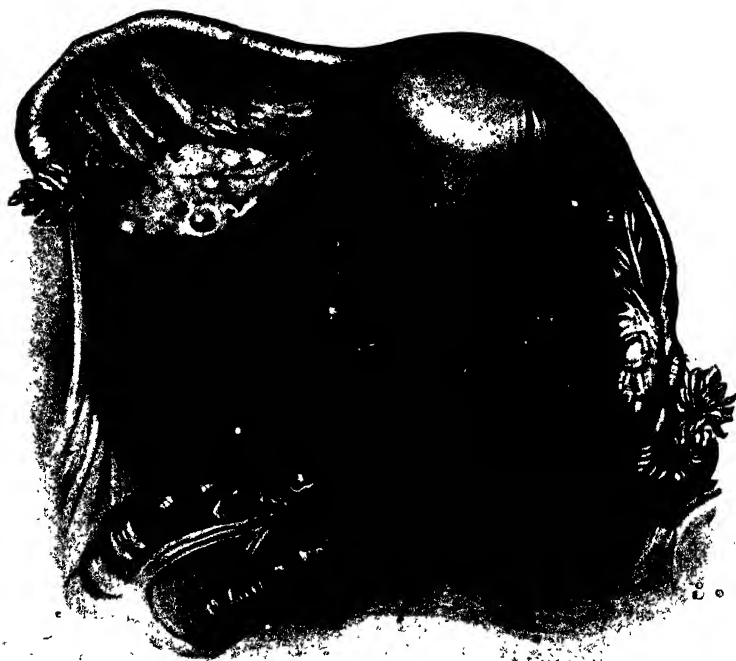


FIG. 42.—The uterus and broad ligaments as seen from behind. The uterine arteries are exaggerated in order to show their position.

firmly fastened to the pelvic wall by the endo-pelvic fascia, and by two folds of the pelvic fascia, and it is also firmly attached to the cervix. In consequence the vagina is able to support the cervix and to fix it in position in the pelvis. The support which the uterus normally receives in this manner is often overlooked, although it is most important.

(3) *The Weight of the Uterus.*—The weight of the uterus acting under the influence of gravitation, in conjunction with the flexible nature of the isthmus and with the action of the ligaments, results in producing a slight degree of forward flexion of the body, and

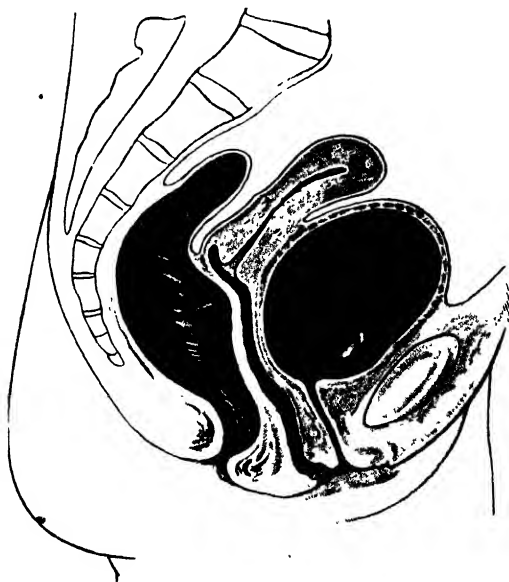


FIG. 43.—Physiological ascent of the uterus, due to distension of bladder and rectum.

marked forward version of the cervix. The flexible nature of the isthmus is greater before pregnancy than after it, and as a result there is a correspondingly greater degree of anteflexion—when the bladder is empty—in nulliparous than in parous women (v. Figs. 39 and 40).

(4) *The Intra-abdominal Pressure.*—The intra-abdominal pressure, acting on the upper surface of the uterus, tends to keep the uterus in contact with the pelvic floor.

(5) *The Resistance of the Pelvic Floor, etc.*—The resistance of the pelvic floor and bladder is a force, acting upwards, which is sometimes in equilibrium with the downward intra-abdominal pressure. At other times, *i.e.*, when the bladder is distending or emptying, it is temporarily either greater or less than the intra-abdominal pressure, and so by

pushing the uterus upwards, or by allowing it to fall further downwards, it causes a diminution or an increase in the degree of flexion and version present. If the distension of the bladder is very marked, the uterus may be pushed into a vertical position, or even a slight degree of retroversion may occur. If the rectum is also distended, the resistance of the pelvic floor may be so increased that the uterus is pushed upwards—*ascent* (*v.* Fig. 43).

The physiological result of all these forces is that the uterus normally lies in a sagittal mesial plane, its anterior surface in contact with the

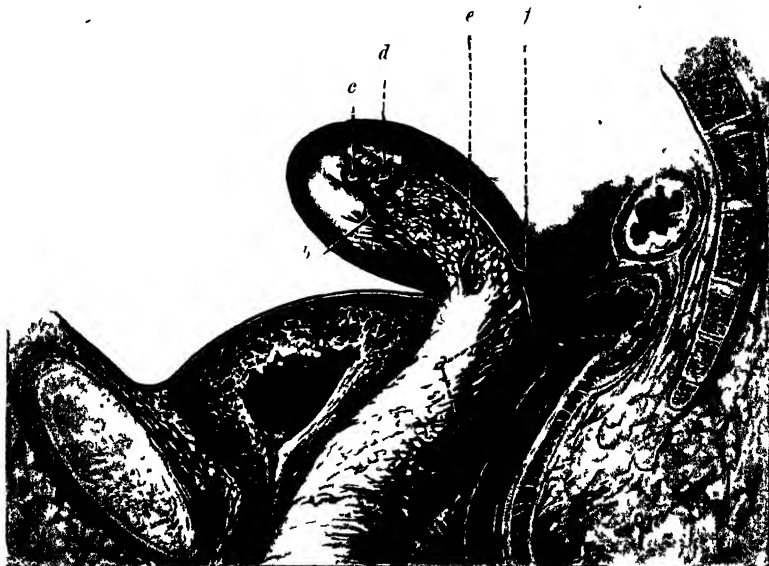


FIG. 44.—The anatomical relations of the uterus and upper part of the vagina. *a.* Insertion of vaginal suspensory ligament. *b.* Round ligament. *c.* Fallopian tube. *d.* Ovarian ligament. *e.* Uterine artery. *f.* Insertion of utero-sacral ligament. (From a dissection by Dr. Cecil Smyly.)

bladder, and the tip of the cervix on a level with the lines joining the ischiatic spines. When the bladder is empty, the cervical axis is almost horizontal, with the fundus in front, and the axis of the body is inclined slightly in front of the cervical axis, so that the fundus rests upon the empty bladder (*v.* Figs. 39 and 40), that is to say the uterus is in a position of marked anteversion and slight antelexion. When, on the other hand, the bladder is full, the uterus will be found in an almost vertical position, or, if the former is over-distended, the cervical axis may be even inclined backwards, that is to say the uterus is retroverted.

Accordingly, we see that the uterus has no one normal position, but rather possesses a constantly changing range of positions, owing to

frequent alterations in the resistance of the pelvic floor and bladder. If the uterus returns to the position it normally occupies when the bladder is empty as soon as that event occurs, none of these positions can be considered as a pathological displacement. When, on the other hand, the uterus does not return to the position it normally occupies when the bladder is empty, or does not leave that position as the bladder fills, then a pathological displacement or malposition exists.

Speaking in general terms, the causes of malposition are to be found in any factors which tend to :—

- (1) Diminish or increase the normal flexibility or mobility of the uterus.
 - (2) Diminish, increase, or change, the direction of the various normal forces which act upon the uterus.
 - (3) Bring into play other forces which normally are not in existence.
- The specific causes which bring about the various abnormal positions will be discussed in their proper place.

UPWARD DISPLACEMENT.

Ascensus or *Elevatio Uteri* is the term applied to the position of the uterus when it lies at a higher level than normal in the abdominal cavity (v. Fig. 38, E).

Ætiology.—Ascent of the uterus may be brought about by :—

- (1) Tumours developing below the uterus in such a position as gradually to push it upwards.
- (2) Adhesions forming between the uterus and some of the abdominal viscera or parietes.
- (3) The operation known as ventral hysteropexy when incorrectly performed.

Symptoms.—It is improbable that ascent of the uterus causes any noticeable symptoms, unless it occurs to an unusually marked degree. Any symptoms, which may be present, will be usually found to be due to the condition which is giving rise to the ascent.

Treatment.—As a rule, the cause of the displacement must be treated, and not the displacement itself. If the condition is due to the presence of a tumour, it will be cured by removing the latter. Peritoneal bands will rarely call for any interference on account of their effect upon the uterus, though they may do so on account of their interference with the intestinal functions.

DOWNWARD DISPLACEMENTS.

As has been stated already, *prolapse* and *procidentia* are only different degrees of the same condition, i.e., descent of the uterus. In prolapse,

none of the uterus has passed the vulvar orifice, while in procidentia, a part or the whole of it has done so (*v. Figs. 38, D, P, and 45*).

Ætiology.—The chief factors which maintain the uterus at its normal level are the uterine ligaments, the pelvic floor, and the vaginal attachments to the cervix.

The ligaments either directly support the uterus, as in the case of the utero-sacral ligaments and the ligaments of Mackenrodt, or indirectly support it by keeping it at right angles to the axis of the vagina and parallel to the pelvic floor, so that the maximum resistance is offered

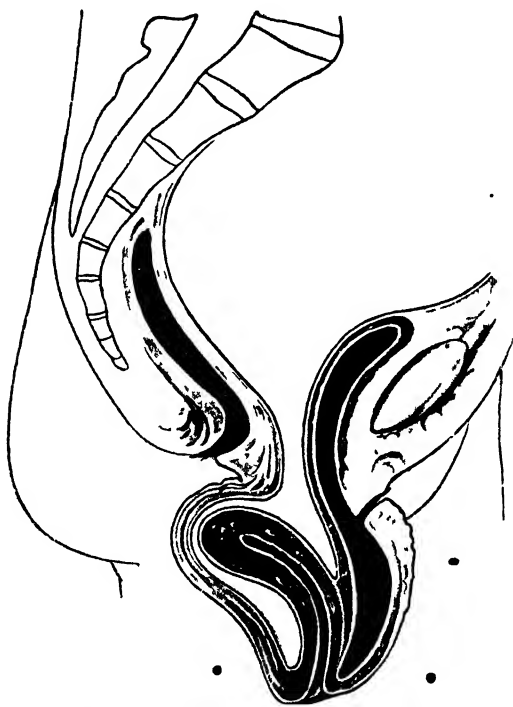


FIG. 45.—Diagram representing complete prolapse (procidentia) of the uterus.

to its descent. When the utero-sacral ligaments are markedly lengthened, the cervix depends for its support on its vaginal attachments, which in turn are supported by the pelvic fascia, and on the so-called ligaments of Mackenrodt, neither of which remains efficient for long. When the utero-sacral ligaments are slightly lengthened, and when there is an accompanying elongation of the round ligaments, backward displacement occurs, and the axis of the uterus more directly corresponds with the vaginal axis. In consequence, descent through the vaginal canal becomes possible.

The pelvic floor directly supports the uterus and resists descent.

The amount of support afforded by the floor depends on its strength and on the extent of uterine surface which is in apposition with it. If the integrity of the floor is destroyed, and its different component parts are either torn or over-stretched, or prolapse, then it can no longer support the uterus; and, if the long axis of the uterus, instead of lying parallel with the floor and so offering a large surface for support, becomes vertical, then the uterus can drop wedge-like through the opening in the floor made by the vaginal canal.

The upper part of the vaginal canal is firmly attached to the pelvic walls, and so helps to support the cervix at its normal level.

There are other factors which, though not of so great importance in maintaining the normal position of the uterus, are occasionally potent in causing or assisting prolapse. The first of these is the weight of the uterus, and the second the intra-abdominal pressure. So long as these remain normal, their effect on the uterus is in equilibrium with the support afforded by the ligaments and the pelvic floor. If either of these, and particularly if the latter, is greatly increased, the two together may overcome the support given to the uterus, which then gradually descends. As it does so, lengthening of the ligaments, and sometimes yielding of the pelvic floor, necessarily follow.

The foregoing are the general factors which, when normal, aid in maintaining the normal position of the uterus, and which, when altered by disease or injury, tend to permit or to cause prolapse. We must now see how this alteration is caused in individual cases.

Elongation of the ligaments may be a primary or secondary factor in the production of prolapse. It is a primary factor when, as a result of sub-involution, it is present after the puerperium and allows the uterus to fall backwards, and so to come into and descend along the axis of the vagina. As the uterus descends, it draws down the vault of the vagina with it, with consequent elongation of the lateral vaginal ligamentous attachments. Descent continues until the uterus reaches the levator muscles, and is then temporarily arrested if these are intact, while, if they are torn or over-stretched, descent continues uninterruptedly. In each case, the result is similar, as the pressure of the uterus will gradually stretch the muscles, even if they are intact, sufficiently to allow further descent. Primary elongation of the ligaments is also sometimes a so-called congenital condition; that is to say, it is present to a marked extent in women who have never borne children, and in whom there is no obvious evidence of any other primary cause of prolapse such as increased intra-abdominal pressure or increased uterine weight. Sometimes this condition is really congenital, and is present in infants at birth. This, however, is very rare, and more usually the prolapse does not

appear until after puberty. In such cases, there may also be congenital hypertrophy of the cervix.

Elongation of the ligaments is a secondary factor under two different conditions :—first, when the weight of the uterus or the intra-abdominal pressure is markedly increased and is directly transmitted to the ligaments, which in turn yield under the strain; and, secondly, when the pelvic floor has been so torn or stretched that it fails to give a normal support, so that the entire weight of the uterus comes on the ligaments. In such cases there is frequently an accompanying prolapse of the vagina, and then not only has the uterus lost the support of the pelvic floor, but there is direct downward traction on the cervix at the cervico-vaginal junction. When this occurs, there is a direct conflict between the down-pull exerted by the vaginal walls and the up-pull exerted by the utero-sacral ligaments. If the ligaments yield and stretch, prolapse continues, and the uterus soon reaches the vulvar orifice. If, on the other hand, the ligaments are strong and maintain their original length, there is marked elongation of the tissues of the cervix between the attachments of the vaginal vault and the attachments of the utero-sacral ligaments (*v.* Fig. 16). This condition is usually spoken of as supra-vaginal hypertrophy of the cervix, and we shall subsequently see that its occurrence has an important bearing on the operative treatment of the case.

Loss of support from the pelvic floor is the result of injury to the floor, and this in almost every case occurs during labour. Very rarely it may be the result of operative interference, as when a deep para-vaginal incision has been made and has failed to unite properly. The essential lesion is the tearing of the levator ani muscles, structures which constitute the most important part of the pelvic floor. When they are torn, the lower part of the vaginal canal loses its support, and the canal itself, which normally makes an angle of sixty degrees with the horizontal, becomes almost vertical. As a result, the anterior vaginal wall is practically unsupported, and intra-abdominal pressure tends to drive it downwards through the vulva. As a further result of the tearing of the muscle, the anterior rectal wall loses its support, and, pressing directly on the lower part of the posterior vaginal wall, gradually stretches it, so that both together protrude through the vulvar orifice. Prolapse of the lower part of the vagina thus begins, dragging with it in almost every case the posterior wall of the bladder, and in some cases an extensive rectal pouch. The downward pull is quickly transmitted to the upper part of the vagina, and, if the fascial attachments of the latter to the pelvic wall yield, is transmitted to the uterine cervix. Then, as we have seen, either supra-vaginal elongation occurs, or else the utero-sacral ligaments also yield and the uterus prolapses.

Increased weight of the uterus of a kind that favours or causes prolapse is generally the result of sub-involution, since we have then in association other factors favourable to prolapse, such as sub-involution of the ligaments and softening of the vaginal attachments. Increased weight due to tumour formation more rarely causes prolapse, since, in the first place, there is usually no accompanying ligamentous softening, and, in the second place, the tumour itself often grows in such a manner as to fix the uterus in its normal position or even to draw it upwards. Sometimes, however, tumours grow in such a manner as to guide the uterus into a position in which its long axis corresponds with the vaginal axis, and then, if the tumour is small, the vagina patulous, and the support of the pelvic floor deficient, prolapse occurs.



FIG. 46.—Sagittal section through the lower part of the pelvis in a case of procidentia uteri. Note the relation of the bladder and rectum to the prolapsed vagina, and the great uterine elongation. (*From Liepmann's Atlas.*)

Increased intra-abdominal pressure, when it acts uniformly over the whole pelvic floor and when it persists for a considerable time, tends to drive the floor down. The first result of this is usually an increased projection of the floor below the level of the outlet of the bony pelvis, very similar to the increased projection that occurs during pregnancy. If the vulvar orifice is patulous and its vaginal support deficient, prolapse of the vaginal walls may occur, and, later, uterine prolapse; or, if the uterus is very small and its ligaments weak, it may be driven down through the vagina, even though the latter is uninjured. Instances of this are sometimes met in stout women who have to stand a great deal, and such cases are usually very difficult to treat or cure.

Diagnosis.—If inspection does not show an existing prolapse of

the vagina or of the uterus, the patient should be told to cough several times, as a prolapse may then occur owing to the increase in intra-abdominal pressure. Next, the cervix should be caught with an American forceps and drawn down in order to see if it can be drawn outside the vulva, and, if so, how far. As this is done, the patient should again cough, so as to bring the uterus out as far as its ligaments will allow. In many cases the prolapse may be so complete that it is visible without any straining effort or traction; but in others, where the prolapse occurs when the patient walks about, the uterus may have gone up again into position, and may only descend when some driving or pulling force is applied to it. The next step is to ascertain what part of the prolapse is formed by the uterus, and what part by the vaginal walls. This is readily done by trying to pass the finger into the vagina. If the vagina is completely inverted, this will be impossible. If the vagina is partly inverted, it will be possible to introduce the finger for a short distance, corresponding to the length of the part of the vaginal canal still in its proper position. It is obvious that in all cases of true descent of the uterus as a whole there must be some descent of the upper part of the vagina also, and, where this does not occur, the prolapsed part will be found to consist of an elongated vaginal portion of the cervix alone.

When the vagina prolapses, we must determine what part of it is chiefly involved. In many cases it will be the entire canal; in some, the anterior and posterior walls; and in some, one of these walls only. If the anterior wall prolapses, the condition is known as cystocele, and one will probably find that the bladder is carried down beneath the vaginal mucous membrane. Where the posterior wall prolapses, the condition is spoken of as rectocele, but it does not follow that in all cases the anterior rectal wall also prolapses. In some cases it does so, but in the majority it is probable that the rectum does not share in the descent. The position of the bladder can be readily ascertained by passing a catheter or sound into it, and the position of the rectum by passing the finger into it. At the same time as the vaginal examination is made, we must ascertain the condition of the levator ani muscle.

In all cases of prolapse occurring as a result of injury received during parturition, the levatores ani are torn. In prolapse occurring as a so-called congenital condition, laceration of the levatores ani has not occurred, but still, owing to the continued pressure of the prolapsed uterus, over-distension and relaxation of these muscles are usually present. The condition of the muscle can be determined by estimating the thickness of the tissue lying between the vaginal mucous membrane and the tuberosities of the ischium. Where no perinæal laceration has occurred, the anterior edges of

the muscle approach one another in the depth of the perinæum, and blend with the superficial perinæal muscle, while, anterior to the point of blending, they form a definite band which can readily be felt from the vagina. If the muscle has been deeply torn this band is missing or



FIG 47.—Diagram to illustrate the various forms of genital prolapse, or pseudo prolapse. AD. Level of origin of utero-sacral ligaments. BE. Normal level of insertion of ligaments into uterus. CF. Normal level of perinæum. I. Normal uterus and vagina. II. Vaginal hypertrophy of cervix. III. Supra-vaginal hypertrophy of cervix. IV. Partial prolapse of uterus. V. Partial prolapse of uterus with supra-vaginal hypertrophy of cervix. VI. Complete prolapse of uterus, with inversion of vagina. VII. Complete prolapse of uterus with supra-vaginal hypertrophy of cervix, and inversion of vagina.

lies at a higher level in the vagina than is normal, and the mass of the muscle can be felt between the mucous membrane and the ischial tuberosities, its distance from the central line of the perinæum being proportionate to the extent to which it has been torn. If the muscles

are atrophied by over-distension, and are absent altogether from the perineal region, owing to excessive tearing, then the surfaces of the ischial tuberosities, as felt from the vagina, are abnormally distinct, and suggest that nothing lies over them except the vaginal mucous membrane.

The examination of the uterus comes next. We have already ascertained whether the cervix prolapses, and, if so, how far, and we must now learn what other changes have occurred, and what is the condition of the utero-sacral ligaments. Descent of the cervix may be caused in one of three ways (*v.* Fig. 47). First, the vaginal portion may be hypertrophied and elongated, the supra-vaginal portion and the body remaining normal. As a result, the cervix may protrude through the vulva, although the body of the uterus remains in its normal place. Secondly, the supra-vaginal portion may be hypertrophied and elongated, the body still remaining in its normal position. As a result, the cervix and the upper part of the vagina prolapse, while the body may remain in its proper place. In the third place, the uterus as a whole may descend to a greater or less extent. Accurate diagnosis between these three conditions is essential for correct treatment, and is, as a rule, quite easy. Simple hypertrophy of the vaginal portion is readily recognised by vaginal examination, while a bimanual examination shows that the body remains at its proper level. The condition of the supra-vaginal portion can be ascertained by noting the distance between the vaginal attachment and the insertions of the utero-sacral ligaments, as, when supra-vaginal hypertrophy exists, this distance is markedly increased. Elongation of the uterus above the insertion of the utero-sacral ligaments also occurs in some cases. The utero-sacral ligaments can usually be felt from the vagina, and, if present, can always be felt from the rectum. They run an almost vertical course from the second piece of the sacrum downwards to be inserted into the lower part of the body of the uterus, and form the lateral boundaries of the pouch of Douglas. If the finger is placed against them, and at the same time the cervix is drawn down, they will be found to tighten and become string-like. Descent of the uterus as a whole is recognised by palpating the body of the uterus, and noting its position relative to the pelvic outlet. In such cases, examination of the utero-sacral ligaments shows that they are elongated, while in supra-vaginal or vaginal hypertrophy of the cervix, existing without prolapse of the body of the uterus, these ligaments preserve their normal length.

We must always remember that any of the conditions mentioned above may occur in association with one another. Thus perhaps the commonest state of affairs in a well-marked prolapse is partial or complete inversion of the vagina, partial or complete prolapse of the uterus,

considerable supra-vaginal elongation of the cervix, and a varying degree of lengthening of the utero-sacral ligaments.

In addition to determining the length of the cervix, one must determine whether there is any "erosion," true ulceration, or laceration present. This is readily done after the cervix has been drawn down externally.

The last step consists in the examination of the appendages of the uterus and the abdominal contents generally with the object of eliminating any cause of increased intra-abdominal pressure, such as tumours, ascites, marked and constant intestinal distension, and excessive fat. When this step is complete we are in a position to determine the correct treatment.

Symptoms.—The symptoms of prolapse of the uterus are not very well marked, but those of procidentia are more definite. Each condition causes, according to its degree, a sense of weight and dragging in the pelvis, pain running upwards towards the kidneys, frequent and difficult micturition or perhaps even retention of urine, constipation, and various reflex troubles—vomiting, epigastric pain, and dyspepsia. As a result of inversion of the vagina, the mucous membrane becomes dry from exposure to the air and from interference with its blood-supply. It is also thickened, and comes to resemble ordinary epidermis. There is often some ulceration of the mucous membrane of the cervix, a condition which, if the procidentia has been present for some time, extends more or less over the entire inverted vagina. If there is much ulceration, there is usually a foetid and purulent discharge. If the ureters are dragged down with the prolapsed uterus, they may become kinked, and an obstruction be thus caused to the flow of urine through them. In consequence, hydronephrosis, and eventually almost complete destruction of the kidney substance, may result. In such cases suppression of urine and its sequelæ may occur at any time.

Treatment.—The treatment of descent falls under three heads:—

(A) Prophylactic treatment.

(B) Palliative treatment.

(C) Radical treatment.

(A) **Prophylactic Treatment.**—Prophylactic treatment consists in preventing the occurrence of, or in removing when they occur, the different factors which may produce prolapse. With this object, perineal or vaginal lacerations should be sutured at the time they occur, or, if they are not seen then, they should be sutured at a later date; backward displacements of the uterus should be corrected, and the uterus kept in a normal position; and patients with lax ligaments, and a tendency to descent of the pelvic organs, should be advised to avoid prolonged standing.

(B) **Palliative Treatment.**—Palliative treatment consists in replacing the prolapsed uterus, and maintaining it in its position by means of a suitable pessary. The reposition of the uterus is generally easily accomplished if the vaginal walls are not excessively œdematous, as is sometimes the case. With the patient in the dorsal position, the genitals having been well washed, the mass protruding outside the vulva is taken in the hand and pushed gently upwards. Care must be taken to press in such a manner that the vulvar end of the vaginal canal is pushed back first. As soon as the entire mass is reduced, a bimanual examination must be made to determine if there is any retro-deviation of the uterus. If there is, it must be rectified. The means by which the uterus is kept in position depend upon whether

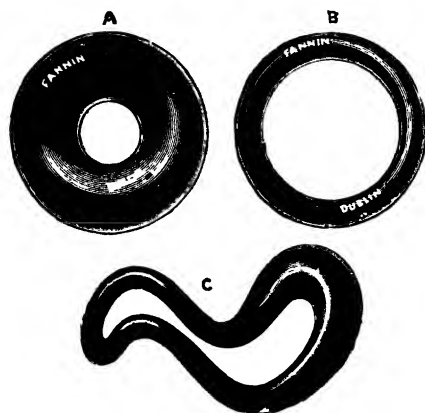


FIG. 48.—Pessaries. A. Hollow vulcanite ring. B. Solid ring of vulcanite or celluloid, representing the first stage in the manufacture of a Hodge pessary. C. Thomas' modification of a Hodge pessary.

the vaginal walls and cervix are free from ulceration and œdema or not. If they are healthy, a suitable pessary may be inserted at once, but if they are unhealthy, they must be restored to a normal condition before doing so. The first step is to cleanse the ulcer thoroughly, and to cauterise it by touching it with strong carbolic acid on a piece of cotton wool. Subsequently daily vaginal douches should be administered, followed by the application of a vaginal tampon of cotton wool soaked in a ten per cent. solution of ichthyol in glycerine, or a mixture of Tr. Benzoin. Co. and glycerine of a strength of a drachm to the ounce. If the patient has to attend to herself, the tampon is tied round with a piece of tape, which hangs outside the vulva. By pulling on this the plug can be easily removed. The simplest method of introducing a tampon is as follows:—Soak one of the required size in whatever medicament one wishes to use, and push it into a cylindrical speculum of large size. The speculum is then passed into the vagina,

and, as it is withdrawn, the end of a forceps or other suitable instrument is held against the tampon, so as to prevent it also being brought out. As a result it is left in place in the vagina, and the friction and discomfort that would be caused by pushing it through the vulvar orifice is avoided. As soon as all ulceration of the vaginal mucous membrane is cured, a pessary may be inserted.

There are a few general rules which apply to the mode of using any form of pessary, not alone in prolapse, but in any displacement in which the use of a pessary is necessary :—

(1) A pessary ought not to be inserted if the mucous membrane of the vagina is unhealthy.

(2) There must be room to pass the tip of the finger round the pessary when *in situ*, between it and the vaginal wall.

(3) Ordinary straining on the part of the patient must not displace the pessary downwards.

(4) The pessary must not cause any pain.



FIG. 49.—Meyer's solid rubber ring.

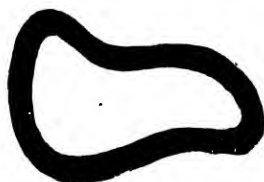


FIG. 50.—Smith-Hodge vulcanite or celluloid pessary.

(5) The pessary must maintain the uterus in a normal position, otherwise it is of no use ; and it must be the smallest pessary which will do this.

(6) The pessary must not be allowed to remain *in situ* for more than three months at a time, and if there is any tendency to vaginal inflammation, it must be removed at much shorter intervals.

There are four forms of pessary which can be used in these cases :—

(1) The solid vulcanite ring is the initial stage in the manufacture of the Smith-Hodge pessary. It is made in sizes varying from one and a half inches to four inches in diameter. It is easily inserted, as all that has to be done is to pass it into the vagina after the uterus has been placed in a normal position. It is specially useful when the uterus is atrophied, as in such cases it is not of much importance whether the latter is kept in a position of anteversion or not, so long as it is kept at its proper level.

(2) The flexible rubber or watch-spring pessary is of use when the vagina is very capacious but the vulvar orifice not very much enlarged, as in such cases it can be more easily introduced than can a rigid pessary. If the uterus is brought into a position of anteversion before inserting the pessary, as should always be done, a rubber ring will frequently keep it so. The disadvantage of this pessary is that it is difficult to keep clean and that the rubber tends to become disorganised.

(3) The hollow vulcanite ring is most useful in cases in which a solid vulcanite ring cannot be retained. It is a comfortable form of pessary, as its large surface does not tend to press to an appreciable extent on any particular part of the vaginal wall. If it is used, the patient must be warned, especially if she is old, that it requires to be taken out tolerably frequently. It is often inserted at an age at which the genitals are beginning to shrink, and, if left in too long, it may become incarcerated owing to the contraction of the vulvar orifice, with the result that its removal may be impossible without breaking it up. It also tends to set up vaginitis by preventing the escape of discharge.

(4) A Hodge pessary, or that modification of it known as a Smith-Hodge, is best suited for those cases in which it is essential for the success of the treatment that the uterus should be kept in a position of anteversion, and in which the perinæum and the levator ani muscle are sufficiently intact to maintain the pessary *in situ*. The manner of inserting it will be described when discussing its use in backward displacement of the uterus. Occasionally it will not remain in position when inserted in the ordinary manner, but will do so if inserted so that the broad end lies lowest.

In addition to inserting a properly fitting pessary, we must direct the patient to avoid as far as possible all forms of violent straining. With this object, the bowels must be regulated, any bronchial or laryngeal condition which causes coughing must, if possible, be cured, and occupations which tend to cause sudden or prolonged increase of the intra-abdominal pressure must be avoided.

(c) **Radical Treatment.**—With the advance of gynecological surgery, the radical treatment of descent of the uterus is becoming every day a more generally accepted procedure, and it is more widely recognised that palliative treatment by means of pessaries is unsound in principle and practice, and should be confined to cases in which circumstances prevent the adoption of operative measures.

The radical or operative treatment of prolapse is directed to the removal of the complications and associated lesions which we have already described, and to the adoption of such measures as will permanently prevent the recurrence of the prolapse. In some cases, however, owing to the age or state of health of the patient, lengthy

operations are impossible, and then the measures adopted may be directed solely to the removal or cure of such conditions as prevent the wearing of a pessary. Thus if a patient has a large erosion of the cervix causing much leucorrhœa, which is intensified by a pessary, amputation of the cervix may enable the pessary to be worn satisfactorily. Or, if a deep laceration of the perinæum prevents the retention of a pessary or necessitates the wearing of one too large for the vaginal canal, a perinæorrhaphy will enable a pessary of suitable size to be worn. Such operations are, however, only palliative, and, wherever possible, a true radical cure, which will prevent the necessity of again wearing a pessary, is preferable.

If we take, for example, a typical case of complete prolapse associated with the usual complications, and discuss its treatment, it will give, perhaps, the best idea of the different operative procedures that are usually necessary. In such a case the uterus will be enlarged and completely prolapsed outside the vulva, and if it is pushed back to its normal level it will fall into a position of retroversion and retroflexion (v. Fig. 51). The entire vagina will be inverted. The bladder will have followed the anterior wall and so in great part will have passed outside the vulva, and the rectum may similarly have followed the posterior wall. The utero-sacral ligaments will be markedly lengthened, and also the round ligaments. The cervix will be hypertrophied supravaginally, and the vaginal portion will probably be ulcerated. The levator ani muscles will be torn, and the vulvar orifice considerably enlarged.

For the cure of such a case it is necessary :—

- (1) To adopt measures that will ultimately effect a reduction in size of the uterus.
- (2) To fix the uterus at its normal level and the fundus in a position of anteversion.
- (3) To remove the hypertrophied cervix.
- (4) To restore the bladder and the rectum to their proper positions, or at any rate to positions in which they cannot again bulge downwards through the vulva.
- (5) To remove superfluous vaginal mucous membrane.
- (6) To restore the muscles of the pelvic floor.

All these will be effected somewhat as follows :—Curetting of the uterine mucous membrane will tend to bring about ultimately a healthier state of the uterus, and so a reduction in size when the enlargement is due to a chronic inflammatory process. When tumours are present, such as small myomata, they must be removed. Shortening of the utero-sacral ligaments will bring the cervix again to a normal level in the pelvis. Shortening of the round ligaments or ventral suspension will keep the uterus in a position of

anteversion. Interposition of the uterus between the bladder and the anterior vaginal wall will support both the vaginal wall itself and the bladder, and, by fixing the uterus in a position of aggravated anteversion, will render any other step to accomplish that end unnecessary. Supra-vaginal amputation of the cervix will remove the hypertrophied portion. Anterior colporrhaphy, when interposition is not performed, will remove the superfluous mucous membrane from the anterior vaginal wall, and at the same time will give some support to the bladder. When interposition is performed it is unnecessary.

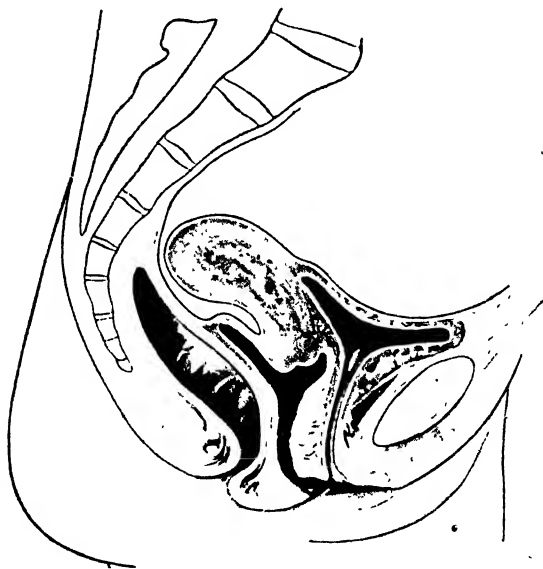


FIG. 51.—Diagram representing a combined retroversion and retroflexion.

Finally, a colpo-perinæorrhaphy, associated with suture of the levator ani muscles, will remove any excess of the mucous membrane of the posterior vaginal wall, and restore again the torn muscles and the perinæum.

BACKWARD DISPLACEMENTS.

The backward displacements of the uterus are retroversion, retroflexion, and retroposition, or any combination of these. As has been mentioned, slight degrees of these displacements may occur physiologically as the bladder is distending, but in order to constitute a pathological condition they must have a tendency to become permanent.

RETROVERSIONS AND RETROFLEXIONS.—Retroversion and retroflexion are generally associated, for the same reason that anteversion and anteflexion are associated when the uterus is normal in position. That is to say, if the uterus is either anteverted or retroverted the weight of the uterine body causes the body to flex until the fundus rests on the surface immediately below it (*v.* Figs. 40 and 51). Thus, when the uterus is turned backwards—retroverted—the fundus falls to the bottom of Douglas' pouch, and so a retroflexion is produced in addition.

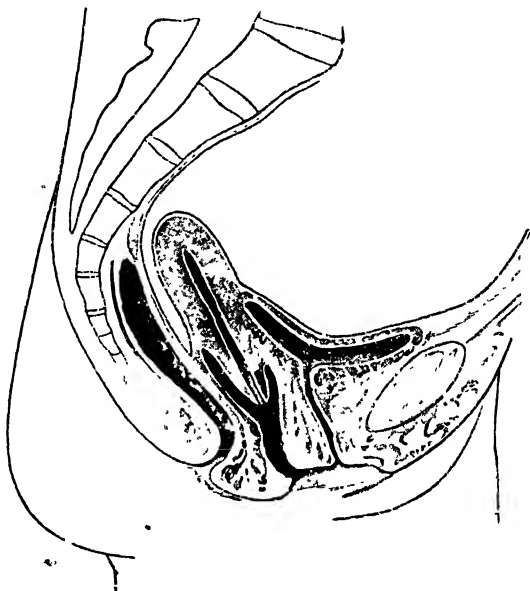


FIG. 52.—Diagram representing a retroverted uterus.

In rare cases, the uterus may be retroverted alone without any accompanying retroflexion (*v.* Fig. 52). This is only possible under the following conditions :—

- (1) If the fundus is held by adhesions in such a manner as to prevent it from falling to the bottom of Douglas' pouch.
- (2) If the uterine tissue has become so rigid from disease that the isthmus has lost its normal flexibility.
- (3) If Douglas' pouch is occupied by a tumour or other mass which prevents the retroflexion of the fundus.
- (4) If the uterus is retroposed to such a degree that the body is supported by the sacrum.

It may be taken as a general rule that, though a combined retroversion and flexion is apparently a greater degree of displacement than a retroversion alone, the latter in the majority of cases is a

proof of the presence of a more marked degree of uterine or pelvic trouble than is the former.

Ætiology.—The commonest cause, speaking in general terms, of combined retroversion and flexion is relaxation of the ligaments associated with increase in size of the uterine body. As a result of the increased size, the fundus tends to fall backwards when the bladder becomes distended, and as a result of the laxity of the ligaments, there is no opposing force to prevent it from doing so. Consequently, the body falls away from the bladder, and then the intra-abdominal pressure acts upon the anterior instead of the posterior uterine wall, and so tends to drive the fundus to the bottom of Douglas' pouch. Such a sequence of events is especially liable to occur after labour, and we are strongly of opinion that the great majority of backward displacements, occurring in otherwise normal uteri, date from the puerperium. It is well to state clearly that displacements are, apparently just as liable to occur after a normal, as after an abnormal, puerperium, and that a prolonged period of rest in bed after labour does not prevent their occurrence.

Rarer causes of backward displacement are the adhesions and bands which are the result of peritonitis and parametritis, the traction caused by enlargements of the adnexa, and the pressure exerted by neighbouring tumours.

The specific causes of backward displacement of the uterus are the following :—

- (1) Chronic metritis.
- (2) Subinvolution.
- (3) Small tumours of the uterus.
- (4) Congenital laxity of the ligaments.
- (5) Congenital mal-development of the uterus.
- (6) Pelvic peritonitis.
- (7) The drawing forwards of the cervix by cicatricial bands, the result of anterior parametritis.
- (8) Enlargements of the tubes or ovaries.
- (9) Habitual over-distension of the bladder and rectum.

Symptoms.—The symptoms caused by backward displacements of the uterus are in the main due to the endometritis by which the condition is almost invariably accompanied; to pressure exerted by the retro-deviated uterus upon the sacral nerves, the rectum, the ovaries, and the tubes; and, more rarely, to traction upon, or pressure against, the base of the bladder, and to an accompanying prolapse of the ovaries. Frequently also oöphoritis results, accompanied by the formation of a cystic condition of the Graafian follicles. As a result, the patient suffers to a very variable extent from menorrhagia and, occasionally, metrorrhagia, leucorrhœal discharges, dysmenorrhœa,

pain in the lumbar or ovarian region, perhaps constipation and rectal tenesmus, and, still more rarely, dysuria. If the ovaries are prolapsed below the uterus, dyspareunia may also result. Sterility, or, if the patient becomes pregnant, abortion, is a common occurrence.

Diagnosis.—The diagnosis of a retro-deviation of the uterus is made by means of a bimanual examination, carried out in the ordinary manner. If, owing to the excessive stoutness of the patient, the rigidity of the abdominal walls, or the presence of tumours, it is impossible to determine the position of the uterus in this manner, it may be necessary to resort to the uterine sound. Too much prominence has been given to the use of this instrument, both as a means of diagnosing and as a means of correcting displacements of the uterus. The sound should only be used for these purposes when the bimanual methods of examination and of reposition have failed; and it must not be used even then unless due precautions have been first taken to ensure that it will not be a means of introducing septic matter into the uterus. In order to determine the position of the uterus by this means, the sound is passed gently into the cavity, allowing it to take its own course. The direction in which the point of the sound travels is noted, and also the direction in which the concavity of the sound looks when the latter is in the uterus. In this way we can determine, first, whether the fundus is in front of or behind the cervix, and, secondly, the direction of flexion of the uterine body.

Treatment.—The treatment of chronic retro-deviations, as of descent of the uterus, falls under three heads:—

(A) Prophylactic treatment.

(B) Palliative treatment.

(C) Radical treatment.

(A) **Prophylactic Treatment.**—It is only possible to carry out the prophylactic treatment of backward displacements on two occasions, because, so far as we know at present, there is nothing at other times to indicate the necessity for adopting such treatment. These occasions are after labour and after operations on the pelvic organs. It is a very proper and necessary precaution to examine a woman during the third or fourth week after labour in every case, as backward displacements are so prone to occur then, even after a normal puerperium. Moreover, if the displacement is corrected, and is kept in position with a pessary for a few weeks, in the majority of cases the pessary can be then removed, and the uterus will remain in its proper position. On the other hand, if the displacement is allowed to continue, it will probably become chronic. The reason of this is obvious. After delivery all the uterine ligaments are relaxed, and, during the puerperium, they normally return to their usual length. If the uterus falls back, they are at first too long to draw it back to its normal position, and subsequently it is probable

that they involute only sufficiently to suit the displaced uterus. Consequently, when the latter is brought forward after a long interval, and after involution is complete, the ligaments are then too long to keep it forward, and, involution being complete, it is too late for any further shortening of them to occur. If, on the other hand, the uterus is brought forward while involution is still unfinished, the ligaments in all probability will return to their normal length.

Again, after operations on the pelvic organs, it is well to perform a prophylactic ventral or vaginal suspension of the uterus, if the operation was of such a nature as to predispose to subsequent falling back of the uterus. This is especially the case in operations on the appendages.

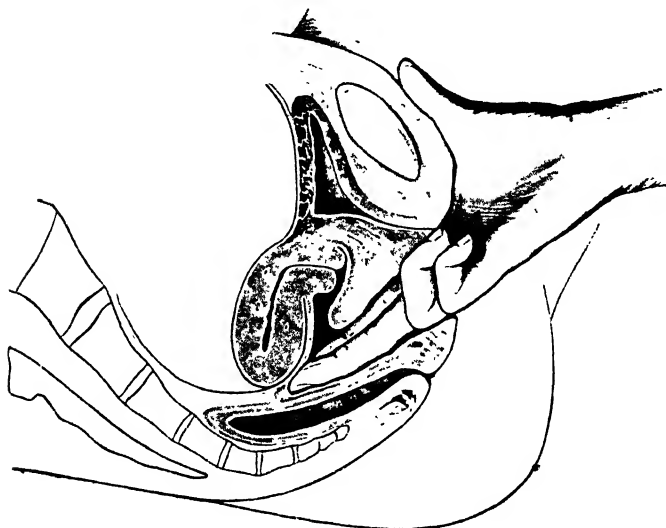


FIG. 53.—Diagram representing the first stage in the manual reposition of a backward displacement of the uterus.

(B) **Palliative Treatment.**—As a general rule, it is advisable to adopt either palliative or radical treatment in all cases in which a retro-deviation of the uterus is met with. Even if the displacement is not at the moment giving rise to any symptoms, it will most probably do so in the future, and, the longer it is allowed to persist, the more difficult will the necessary remedial treatment become. Perhaps the only instance in which this rule does not hold good is when a backward displacement is met with after the menopause, in association with a senile and atrophic uterus. In carrying out either palliative or radical treatment there are two objects to be aimed at:—the maintenance of the uterus in a normal position and the cure of the accompanying endometritis.

The palliative treatment of retro-deviations consists in replacing the uterus, in keeping it in position by means of a suitable pessary, and at the same time in treating the accompanying endometritis by local applications to the endometrium. It is most likely to yield good results when the displacement is due to subinvolution or endometritis, and when, by curing these conditions, we bring about a diminution in the size of the uterus.

The reposition of the uterus is a proceeding which in the large majority of cases is quite simple, but which may be attended with any degree of difficulty or be impossible. Difficulties are caused by rigidity

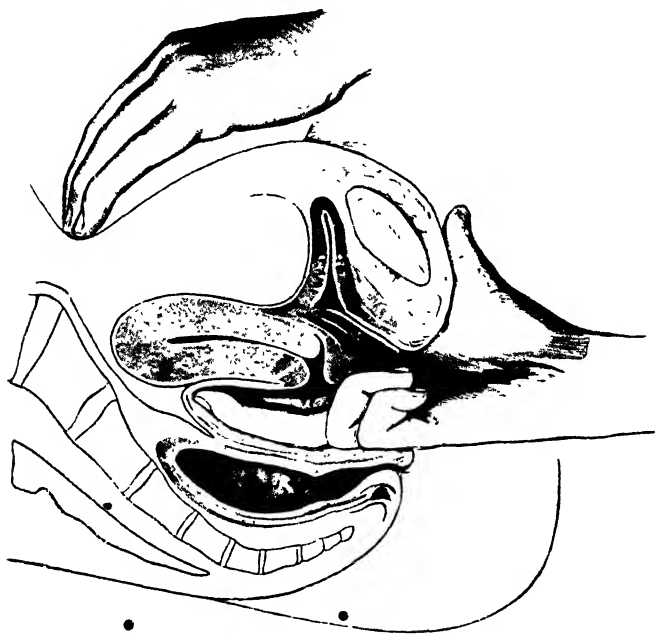


FIG. 64.—Second stage in the reposition of a backward displacement of the uterus.

or excessive fatness of the abdominal wall, by the presence of adhesions, by the impaction of the uterus in the pelvic cavity, and by the pain to which attempts at reposition sometimes give rise. In such cases, it is usually necessary to give the patient an anæsthetic in order to replace the uterus satisfactorily.

Reposition should whenever possible be carried out bimanually, and the use of the sound should be avoided unless an accurate diagnosis of the state of affairs present has been made. If there are adhesions holding down the uterus, or if for any reason the uterus does not respond readily to the pressure of the sound, the latter may easily be pushed through its walls. In many cases, we can replace a uterus

bimanually which we could not replace with the sound, and perhaps the only instance in which we can succeed with the sound where the hands have failed is when the abdominal wall is very rigid or very fat.

The steps in the reposition of a uterus which is not bound down by adhesions will be most easily understood by reference to the accompanying diagrams. With the patient in the dorsal position, the first step consists in introducing one finger of the right or left hand, as the operator chooses, into the vagina, the other hand lying on the abdominal wall,

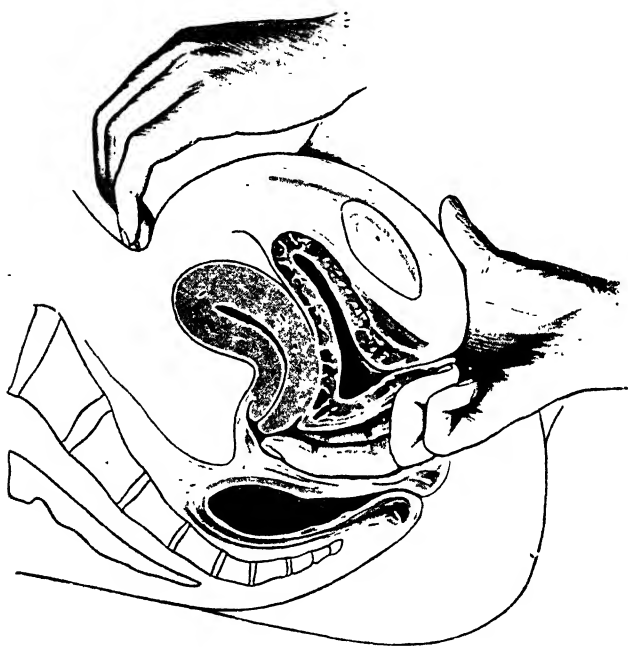


FIG. 55.—Third stage in the reposition of a backward displacement of the uterus.

as if a bimanual examination was being made (v. Fig. 2). The fundus of the uterus is felt with the vaginal finger passed into the posterior fornix, and pressure is made upon it in such a direction as to cause it to rise upwards towards the pelvic brim (v. Fig. 53). This pressure is continued until the fundus is pushed up as far as the length of the finger will allow (v. Fig. 54). Then the finger is moved from the posterior fornix to the anterior, and backward pressure is made upon the cervix. This pushes the cervix backwards beneath the fundus, and so enables us to push the latter higher out of the pelvis, by adding to the length of the vaginal finger the thickness of the cervix (v. Fig. 55). By this time, the fundus has been brought within the reach of the external hand—which up to this has been doing nothing, and, by

depressing the abdominal wall below the umbilicus, we are enabled to get the fingers behind the fundus and to draw it forwards, while with the vaginal finger in the anterior fornix we continue to press the cervix backwards. Finally, we are able to palpate the body of the uterus through the anterior fornix and recognise the fact that it is lying in front (*v.* Fig. 56). If one finger is not long enough to replace the uterus, insert both index and middle fingers, as shown in the diagram, a proceeding which adds on about half an inch to the upward reach of the fingers.

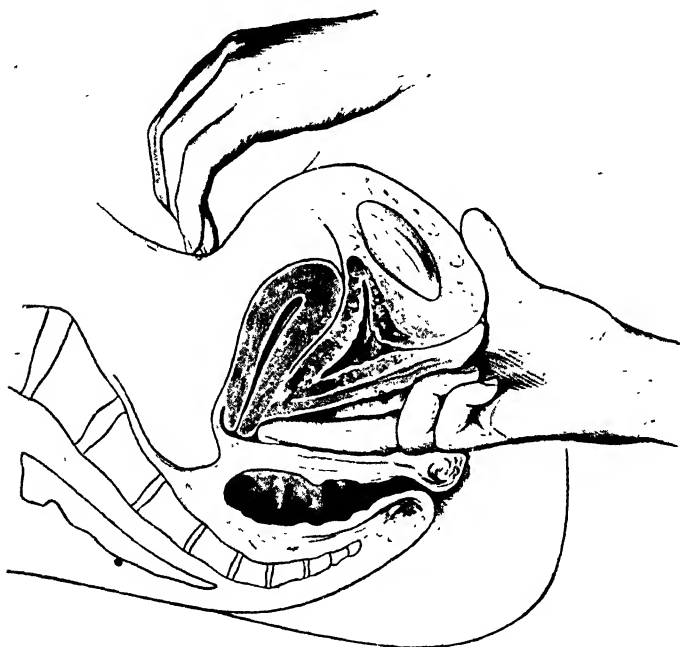


FIG. 56.—Final stage in the reposition of a backward displacement of the uterus.

In most cases, reposition is greatly facilitated by using in addition to the fingers an American forceps. The anterior lip of the cervix is caught with this, and is drawn downwards. The uterus follows, and, as it does so, it straightens out, while at the same time the fundus is brought within easy reach of the finger in the posterior fornix. The fundus is then pushed upwards and forwards with the finger, and the cervix is carried upwards and backwards by pushing the forceps gently in the same direction. Lastly, the fundus is drawn forwards with the fingers of the external hand. Another manoeuvre by which reposition can be often facilitated consists in passing the middle finger into the rectum and the index finger into the vagina, and pushing up the fundus with the former finger.

When the fundus is bound down by adhesions radical treatment is always indicated.

As soon as the uterus has been replaced, the next question is—What are the best means of keeping it in its proper position? In the majority of cases a pessary of some kind—probably Smith-Hodge—will be found most suitable. If, however, there is any pelvic tenderness, or if the uterus is very soft and congested, there may be some difficulty in finding a pessary which will not cause pain. In such cases, it is best to attempt to keep the uterus in its position by means of vaginal tampons composed of cotton wool soaked in glycerine, or preferably ichthyol-glycerine, as the latter has more effect in relieving the congestion.

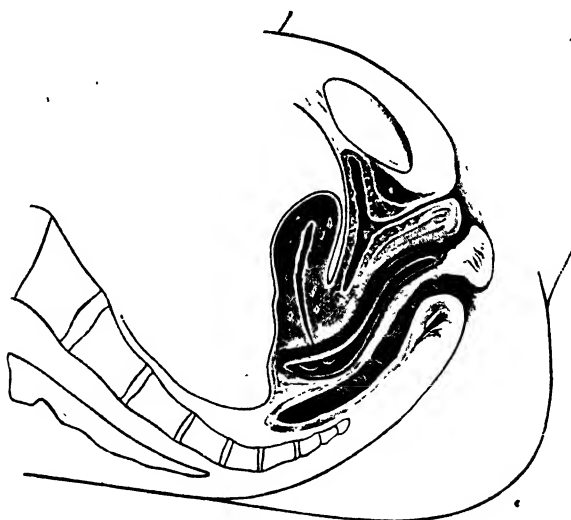


FIG. 57.—Diagram representing a Smith-Hodge pessary *in situ*.

These plugs should be changed, if possible every day, if not, at least every second day, and their use should be continued until congestion and tenderness have disappeared. A pessary may be then inserted.

The same rules apply to the insertion of a pessary in cases of retro-deviations of the uterus as in cases of prolapse. The form of instrument which is usually found to be most suitable is a Hodge, or that modification of it known as Smith-Hodge. This pessary is usually made in vulcanite, but the celluloid form is preferable, as its shape can be more easily changed in order to adapt it to any particular case. Either of these pessaries keeps the uterus in a position of ante-version by pushing up the posterior vaginal fornix, and so drawing the cervix further backwards. The uterus must be in its normal position before the pessary is inserted. The latter is then held in the fingers of the right hand, while the fingers of the left hand

separate the labia. It is pushed gently upwards through the vulva, its larger end first and its transverse diameter corresponding to the antero-posterior diameter of the vulva. As soon as the larger end of the pessary has passed into the vagina, the index finger of the right hand is slipped up behind the pessary and by pressure on its upper end guides it over the cervix. At the same time, the whole pessary is gently rotated until its transverse diameter corresponds with the transverse diameter of the vagina, so that it now lies with its larger end in the posterior fornix, *i.e.*, above and behind the cervix, and with its greater concavity forwards (*v.* Fig. 57). Care must be taken that the narrow end which is lowest does not press to an injurious extent upon the urethra.

A pessary must not be left in the vagina for longer than two or at most three months, without removing it for cleansing purposes. If the vaginal discharge is purulent or very profuse, the patient should use a vaginal douche daily, or every second day, but in such cases pessary treatment is really contra-indicated. Occasionally, a solid vulcanite ring pessary, or that form known as Thomas' pessary (*v.* Fig. 48, B, C), will be found more suitable than the Smith-Hodge.

(C) **Radical Treatment.**—The radical treatment of backward displacement consists in the adoption of such operative measures as will fix the uterus in a position of anteversion, or anteversion and ante-flexion. Many different operations have been devised for this purpose, and we must refer to the most important of these. Such operations may be classified as follows:—

(1) Operations which directly suture the body of the uterus in a forward position, either to the abdominal or the vaginal wall.

(2) Operations which draw the body of the uterus forward by shortening the round ligaments.

(1) In the first group come the operations which are known as hysteropexies, and these may be carried out by the abdominal or by the vaginal route. Vaginal hysteropexy consists in suturing the uterus to the anterior vaginal wall after first separating the bladder and pushing it upwards out of the way. Ventral hysteropexy consists in opening the abdomen in the middle line and suturing the uterus, either to the abdominal fascia or recti muscles (ventral fixation), or to the abdominal peritoneum (ventral suspension).

The objections urged against both these operations are that they bring the uterus from one malposition into another, *i.e.*, from a position of retroflexion into a position of excessive ante-flexion in the case of vaginal fixation, or into a position of ascent and ante-position in the case of ventral fixation; that they fix the uterus in a single position, whereas the normal condition of the uterus is one of great freedom of

movement; and that this obstacle to free movement may interfere with the proper development of the uterus and the progress of parturition if the patient should become pregnant.

These objections undoubtedly apply to all *fixation* operations, but they do not apply to *suspension* operations, and for this reason a clear distinction must be drawn between the two. The object of a fixation operation is to obtain a firm and comparatively unyielding union between the uterus and either the vaginal or the abdominal wall, as the case may be. The object of a suspension operation is to create an elastic and comparatively weak union between the uterus and the

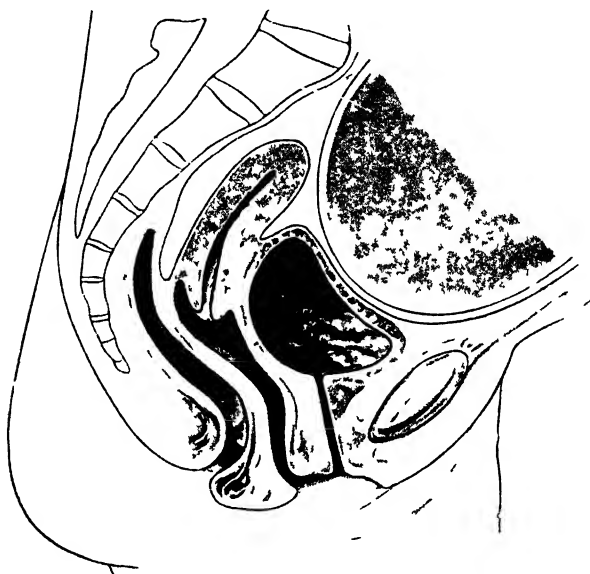


FIG. 58.—Retroposition of the uterus due to the presence of a distended bladder and an abdominal tumour.

peritoneum. This union gradually becomes drawn out into an artificial ligament, which, by its length, permits the fundus to have a slight, but sufficient, range of antero-posterior movement. If pregnancy occurs, and the uterus rises out of the pelvis, it is probable that in all cases the union ruptures.

Fixation operations are only permissible when the patient is past the child-bearing period, and then they are of considerable value in bringing about a radical cure in cases of prolapse associated with backward displacement. Suspension operations are not associated with any ill consequences during pregnancy, and hence are always permissible.

(2) The operations in the second group are directed towards the

shortening of the round ligaments or to the suspension of the uterus by them.

To shorten the round ligaments they are exposed at the external abdominal ring; the distal portion is then drawn out as far as possible and cut away, the end of the remaining portion being sutured to the walls of the ring.

Suspension of the uterus by the round ligaments can be effected by drawing a loop of ligament outwards through the abdominal peritoneum and the rectus muscle or fascia, and then suturing it to

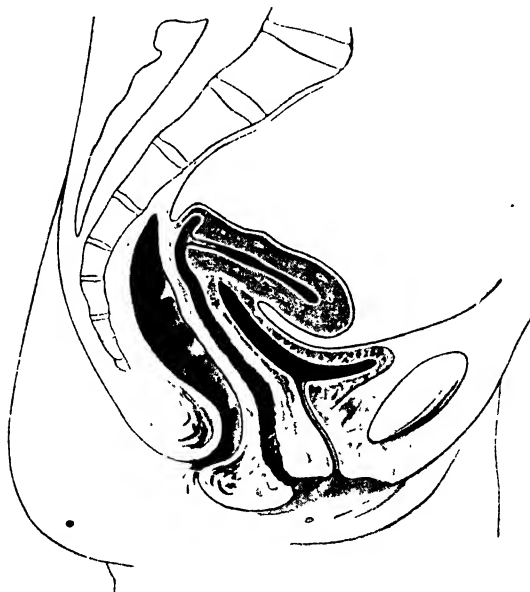


FIG. 59. —Pathological anteversion of the uterus due to dragging backwards of the entire cervix.

a loop of the opposite ligament which has been brought out at a corresponding point at the opposite side of the abdominal incision.

RETROPOSITION.—Retroposition of the uterus is the result of tumours so situated in front of the uterus as to drive the latter backwards (v. FIG. 58), and of adhesions or cicatricial contractions of the posterior ligaments pulling it back.

Treatment.—Retroposition of the uterus, when due to the pressure of tumours, etc., can only be cured by the removal of the latter. When due to adhesions or to shortening of the utero-sacral ligaments,

it may be relieved by the stretching of such adhesions, but in many cases abdominal section, and separation of the adhesions, will be necessary. This class of case will be more suitably discussed under the head of pelvic peritonitis.

FORWARD DISPLACEMENTS.

Forward displacements of the uterus include some degrees of ante-flexion and anteversion, and anteversion. A marked degree of anteversion of the uterus and a slight degree of ante-flexion are, of course, the normal position.

ANTEVERSION AND FLEXION.—There is considerable difficulty in deciding where to draw the line between the normal anteversion and ante-flexion of the uterus and what is known as pathological anteversion and ante-flexion. Schultze suggested that “anteversion and ante-flexion are pathological when they are stable, that is when the normal movements of the uterus out of these positions are impeded.” Bearing this in mind, the following may be given as suitable definitions :—

Pathological anteversion is that position of the uterus in which the axes of the cervix and of the fundus coincide, the fundus being in front, and in which the normal flexibility of the uterine isthmus is impaired or destroyed (v. Fig. 59).

Pathological ante-flexion is that position of the uterus in which the body is bent markedly forwards, so that the fundus approaches the anterior surface of the cervix, and in which the normal flexibility of the uterine isthmus is impaired or destroyed (v. Fig. 60).

Pathological anteversion is not a condition of very much importance. It may be caused by the excessive uterine rigidity which results from metritis, by a shortening of the utero-sacral ligaments dragging the entire cervix backwards, and by small tumours situated at the fundus. The symptoms which are associated with it are generally referable to the cause of the condition more than to the condition itself, *i.e.*, to the metritis or pelvic peritonitis, as the case may be. Occasionally, a marked degree of anteversion may cause irritability of the bladder. The treatment of anteversion is directed towards the cure or relief of its cause.

Pathological ante-flexion is a condition of more importance, and is often found in association with retro-position of the uterus, with stenosis of the cervical canal, and with conical elongation of the cervix.

Ætiology.—Pathological ante-flexion of the uterus may occur as a result of :—

- (1) Shortening of the utero-sacral ligaments, or the formation of retro-uterine adhesions, either with or without tubal infection, which drag the isthmus backwards while leaving the fundus free. These cases are associated with retroposition and retroversion of the uterus.
- (2) Persistence of the infantile type of uterus. These cases are associated with conical elongation of the cervix and stenosis of the cervical canal, and are probably due to partial failure of development of the anterior uterine wall.

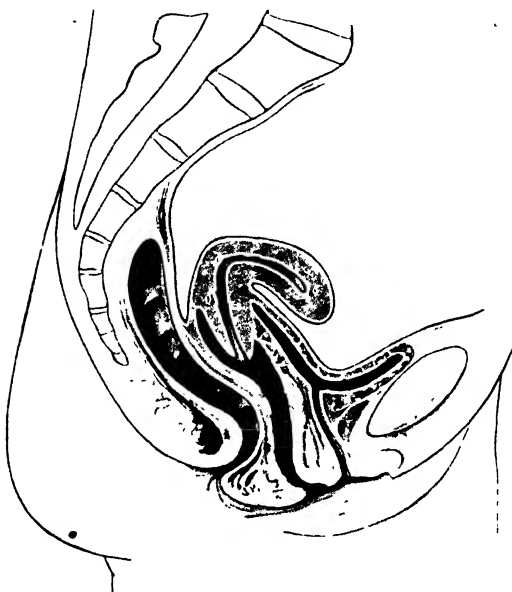


FIG. 60.—Diagram representing acute ante flexion of the uterus. There is also some degree of retroposition.

- (3) Vaginal fixation of the uterus. These cases rarely, if ever, give rise to any symptoms.

Symptoms.—The symptoms of ante flexion, as a rule, are due to :—

- (1) The acute bend which is found at the junction of the body and cervix.
- (2) The accompanying stenosis of the cervical canal.
- (3) The accompanying endometritis.

The most prominent symptoms are dysmenorrhœa, sterility, and variable menstrual troubles. The direct cause of the first two is still a matter of some dispute. The pain comes on a day or so before the menstrual discharge, usually ceases on the appearance of the latter, and is severe and paroxysmal in character. Its origin has been attributed variously to the irritation and compression of the uterine

nerves caused by the menstrual congestion of the uterus, and to the uterine contractions set up by the retention of menstrual discharge owing to the obstruction caused by the flexion and the stenosis of the cervical canal. In the latter connection, it may be mentioned that the expulsion of clots from the uterus is found to be attended by the relief of the pain, and any cessation in their expulsion by its return.

Sterility is caused, in all probability, by the endometritis which is usually present. It is also suggested that the flexion and the stenosis may prevent the entrance of spermatozoa, but, when the minute size of these is taken into account, this does not appear very probable. In some cases, sterility is due to the non-development of the uterus or ovaries, and, in quite a number of cases, it is due to an associated pelvic peritonitis and perhaps salpingitis.

Menstrual troubles are the result of the accompanying endometritis, and vary in different cases. Usually, menstruation is scanty, but, on the other hand, it may be profuse, and occasionally there may be metrorrhagia.

On examination of the patient, the uterus is usually found to be small and somewhat retroposed, with a knob-like prominence in front, formed by the body. The cervix is often elongated and conical, and the external os may be so small that it cannot be felt. If we attempt to pass a sound, the latter is stopped by the stenosed internal os. Sometimes it cannot be passed into the uterus, but this can generally be done if the bend of the sound is increased.

Treatment.—The usual treatment of these cases is directed towards removing, as far as possible, the stenosis of the cervix and the obstruction caused by the acute bend, and to curing the endometritis. The treatment is thus the same as that described in the case of stenosis of the cervix, viz., dilatation or some form of posterior division and curetting. The occurrence of pregnancy cures the condition. If there are adhesions dragging the uterus backwards, the abdomen should be opened, the adhesions separated, and a ventral suspension performed. Further, if the history of the case suggests the possibility of pelvic adhesions, and if other treatment has been tried without avail, then an exploratory laparotomy is indicated.

ANTEPOSITION.—Anteposition of the uterus is that condition in which the uterus as a whole is displaced in a forward direction.

It is usually caused by tumours, or accumulations of blood, pus, or adherent intestines in Douglas' pouch (*v.* Fig. 61). More rarely, it is caused by cicatricial contractions—the remains of an anterior parametritis—dragging the uterus forwards towards the symphysis. The symptoms which arise from anteposition of the uterus are due to the cause of the displacement rather than to the displacement itself. If

the latter is due to tumours or other enlargements, the treatment suitable to them should be adopted ; if to old parametritis, attempts must be made to bring about absorption of the exudate.

LATERAL DISPLACEMENTS.

Lateral displacements of the uterus include dextro- and sinistroversion and -flexion, and dextro- and sinistro-position. The meaning of these terms has been already explained.

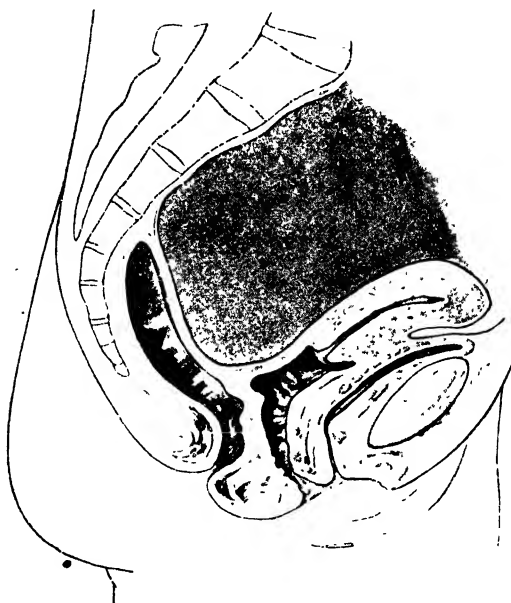


FIG. 61.—Anteversion of the uterus due to the presence of a tumour in Douglas' pouch.

Ætiology.—*Dextro- and sinistroversion and -flexion* are most frequently caused by contraction of one broad ligament occurring as a result of parametritis, and by the adhesions formed in the course of an attack of pelvic peritonitis. Occasionally, these displacements are due to the pressure of tumours. The side to which the uterus is deflected depends upon the part of the broad ligament which has become shortened. If the contraction takes place at the top of the ligament, then the body of the uterus is displaced to the same side as the contraction. If the contraction takes place about the level of the os internum, then the cervix is dragged to that side, while flexion of the body occurs in the opposite direction (v. Fig. 62).

Dextro- and sinistro-positions of the uterus are produced by very much the same causes as are the foregoing displacements, that is to

say, tumours and other enlargements, particularly when they occur between the layers of the broad ligament, contractions of the broad ligament, and peritoneal adhesions. A unilateral parametric exudate is a common cause, and will tend to push the uterus towards the opposite side of the pelvis. When the exudate has undergone absorption, and is represented by a contracted ligament, the latter will pull the uterus towards the same side of the pelvis. In such cases, dextro-position of the uterus is frequently associated with sinistrotorsion, or *vice versa* (v. Fig. 62).

Treatment.—The treatment of these cases is determined by the cause.

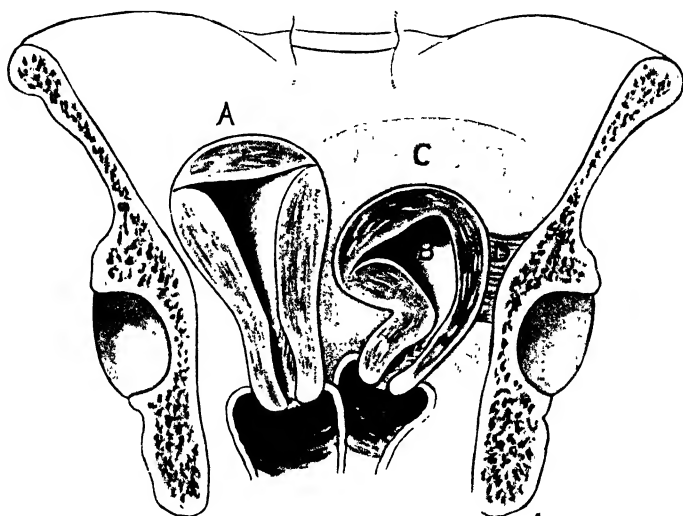


FIG. 62.—Diagram representing some lateral deviations of the uterus. A. Uterus in extreme dextroversion, the result of the pressure of an exudate, C, in the left broad ligament. B. The same uterus in a position of sinistrotorsion, dextroflexion, and sinistroposition as a result of the absorption of the exudate and the consequent cicatricial contraction of the ligament.

Displacements, which are due to the presence of a tumour, will be corrected by the removal of the tumour. The treatment of cases due to inflammatory changes will be discussed under the head of pelvic peritonitis.

TORSION.

Torsion of the uterus consists in a rotation of the uterus as a whole on its axis away from the median plane, either towards the right—dextrotorsion, or the left—sinistrotorsion. The normal position of the uterus is one of slight dextrotorsion. A pathological degree of torsion is most frequently associated with an unequal degree of contraction or relaxation of the utero-sacral ligaments, such as occurs in posterior

parametritis or peritonitis. Torsion to a more marked extent may occur in connection with the twisting of the pedicle of an ovarian cyst, or of a pedunculated sub-peritoneal myoma, and, further, a uterus enlarged by an interstitial myoma growing in its upper part may rotate on its own elongated cervix.

The diagnosis of a pathological degree of torsion is made by careful bimanual examination. The treatment, if any is required, is that of the pathological condition to which the torsion is due.

INVERSION.

When the form of the uterus is altered in such a manner that the inner surface of the organ is turned outwards, and the outer surface inwards, the uterus is said to be inverted. This form of uterine displacement is exceedingly rare, and is apparently becoming rarer every day—a fact probably due to the more frequent early cure of those conditions, *e.g.*, submucous myomata, which predispose to the occurrence of chronic inversion, and, in the case of acute inversion, to the better management of the third stage of labour.

Degrees.—There are three degrees of inversion, as follows :—

(1) A first degree, in which the inverted fundus lies at or above the os externum. This degree, which is the initial stage of all inversions, is rarely if ever permanent, as it tends either to become reduced, or else to continue and to pass into one of the succeeding degrees.

(2) A second degree, in which the fundus has descended lower, and in which more or less of the inverted uterus lies below the external os. It is the degree of chronic inversion usually met.

(3) A third degree, in which the entire uterus, including the cervix, has become inverted (*v.* Fig. 63).

Varieties.—Two varieties of inversion are met with :—

I. Acute inversion.

II. Chronic inversion.

I. ACUTE INVERSION.—Acute inversion is, strictly speaking, an obstetrical condition, but it is advisable to say a few words about it here. An inversion of the uterus is termed *acute* when it occurs immediately after confinement. It is said to be the more common variety of inversion, although it is one of the rarest of obstetrical complications.

Ætiology.—Three conditions must be associated in order to permit the occurrence of either the second or third degree of inversion :—enlargement of the cavity of the uterus ; relaxation of part of its wall ; and a cervix which is sufficiently dilated, or capable of being sufficiently dilated, to allow the passage of the body of the uterus.

All these conditions are fulfilled after delivery when the uterus does not contract well. With these conditions present, if the intra-uterine pressure becomes less than the intra-abdominal pressure the fundus dimples in, and, if this relationship between the two pressures continues, inversion goes on until it becomes complete. Accordingly, any factor which brings about this relationship between the two pressures may be regarded as the exciting cause of the inversion. The principal of these factors are :—

(1) Dragging upon the placental site—in the case of a fundal insertion of the placenta—by pulling upon the cord while the placenta is still adherent.

(2) Violent straining associated with sudden emptying of the uterus, as :—precipitate labour; or severe straining and pressure, during the removal of the placenta, while the uterus is in a relaxed condition.

Symptoms.—The occurrence of acute inversion is usually marked by the collapse of the patient, a collapse which may come on immediately after inversion occurs, or, more rarely, a few hours later. If the placenta has been separated in part or altogether, there will also be severe hæmorrhage.

Diagnosis.—If the hand is placed upon the abdominal wall, the absence of the fundus of the uterus from its usual position will be readily determined. If a careful bimanual examination is made, it may be possible to determine the existence of a cup-shaped depression corresponding more or less exactly to the former position of the cervical canal. At the same time, the vagina is found to be occupied by a globular tumour to which the placenta may or may not be attached, or in extreme cases the vagina may be also partially or completely inverted, and so the inverted uterus lie in part or altogether outside the vulva. The diagnosis is then at once obvious. If the inversion is only partial, the fundus of the uterus will be felt with a cup-shaped depression in its centre.

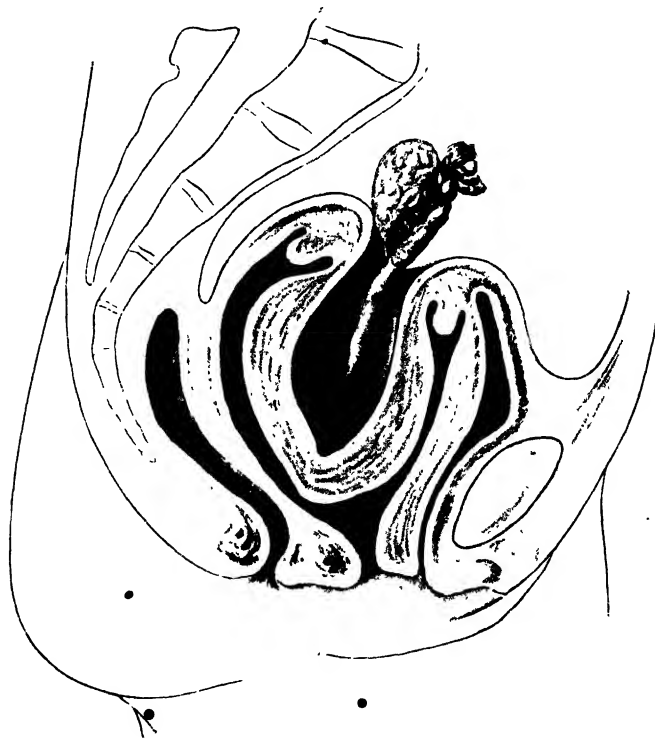
Treatment.—The treatment consists in the detachment of the placenta, the replacement of the uterus, and the adoption of measures calculated to keep it in its normal position.

There is nothing special to be said with regard to the removal of the placenta, it is carried out in the ordinary manner, the greatest care being taken to ensure asepsis. The replacement of the uterus is usually not a very difficult matter. The uterus is grasped in the hand, and pushed gently upwards, trying to return first the part that came down last. If the size of the uterus prevents its reduction, it is possible that the proceeding would be facilitated by the application of adrenalin, in order to cause a temporary partial anæmia, and so a temporary reduction in the size of the uterus. At any rate, adrenalin might be

tried, as, if used in a sterile solution, it could cause no harm and might prove of value.

As soon as the uterus has been replaced, it is douched thoroughly, and plugged firmly with iodoform gauze with the object of preventing the recurrence of the displacement.

Prognosis.—An acute inversion, if left untreated, is frequently fatal. If the patient survives, it passes into the chronic condition. If the condition is recognised, and treated before the patient has lost an



• FIG. 63.—Complete inversion of the uterus.

excessive quantity of blood, and before the uterine cavity has become infected, the prognosis is fairly good.

II. CHRONIC INVERSION.—Chronic inversion is the term applied to an acute inversion which has not been reduced, and which the patient has survived, and also to an inversion which arises slowly in a non-parturient uterus.

Ætiology.—As has just been mentioned, a chronic inversion may be the result of the acute variety. Such a cause is however rare, as, if an acute inversion is not treated, the patient generally dies. The

common cause of chronic inversion is a sessile or polypoid myoma in the uterine cavity, which drags down the fundus after it as it is expelled from the uterus.

Symptoms.—The symptoms are recurrent hæmorrhages more or less

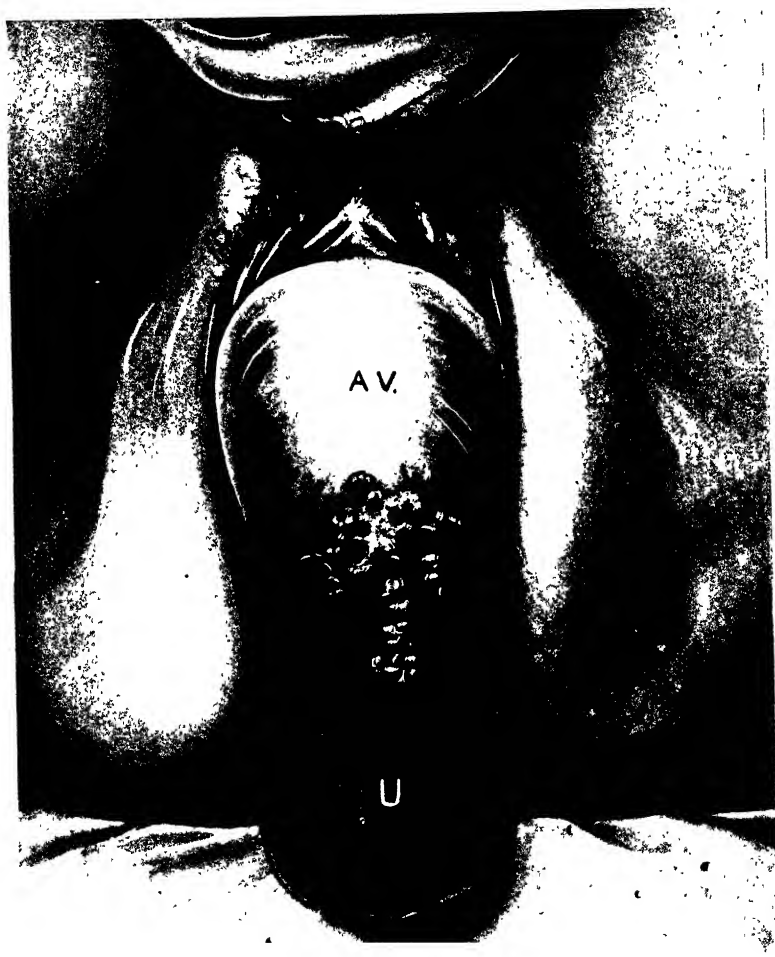


FIG. 64.—Chronic inversion of the uterus and the vagina. U. Uterus. A.V. Anterior vaginal wall. (From a photograph lent by Dr. Arthur Holmes.)

profuse in amount, sacral pain, a feeling of weight in the pelvis and an inclination to strain, and, if the tumour or the uterine wall sloughs, a profuse and foetid discharge. In some cases, descent of the uterus accompanies the inversion, and then a tumour will be found outside the vagina (v. Fig. 64); if there is no descent, the tumour will occupy the vagina (v. Fig. 63).

Diagnosis.—The diagnosis of inversion will be readily made by a bimanual examination. A tumour will be found in the vagina, and the body of the uterus will have disappeared from its usual position. If the patient is not too stout, a cup-shaped depression, as in the acute form, will be felt just above the roof of the vagina, and the ovaries may be palpated at the edge of it.

An inverted uterus has to be distinguished from a polypus projecting into the vagina from a normally situated uterus. The two conditions somewhat resemble one another, if only a cursory examination is made, but, if the case is carefully examined, no difficulty presents itself. The distinguishing points are :—In the case of inversion, the body of the uterus is not found in its usual position, while in the case of a polypus it occupies its usual position. Again, in a polypus, the cervical ring can be felt surrounding the pedicle, and a sound passed through this ring by the side of the pedicle will pass upwards into the uterine cavity. In

FIG. 65.

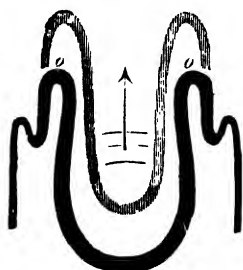


FIG. 66.

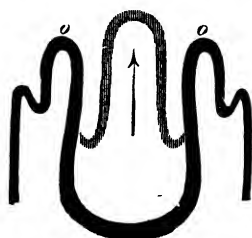


FIG. 65.—Method A, of reducing a chronic inversion of the uterus. (Schultze.)

FIG. 66.—Method B, of reducing a chronic inversion of the uterus. (Schultze.)

the case of an inverted uterus of the third degree, no such ring will be found, and it will be impossible to pass a sound upwards beside the tumour. In the case of an inverted uterus of the second degree, a ring can be felt round the tumour, but the sound can only be passed upwards through it to a very slight extent.

Treatment.—Chronic inversion of the uterus may be treated by the following methods :—

- (1) Gradual reduction of the inversion, after removal of any tumour present.
- (2) Rapid reduction of the inversion, after removal of any tumour present.
- (3) Extirpation of the inverted uterus.

(1) **Gradual Reduction.**—Gradual reduction of the uterus can be effected in many cases, after the removal of any tumour present, by the prolonged use of some form of repositor, as Aveling's or Tait's, or by plugging the vagina with iodoform gauze in such a manner

as to cause an upward pressure on the inverted uterus. The gauze is changed daily until the inversion is reduced. Gradual reduction, however, has been given up to a large extent, and its place taken by some form of rapid reduction.

(2) **Rapid Reduction.**—Rapid reduction is performed manually either without or with preliminary dilatation of the narrow isthmus of the inverted uterus. In all cases, an attempt should be first made to replace the uterus with the hand, as in the acute form. Two methods of doing this are shown in the accompanying diagrams (*v.* Figs. 65, 66). In method A, the part of the uterus which was inverted last is to be replaced first, and the fundus consequently is the last part reduced. As a result, at no time is more than one ring of uterine tissue passing through the obstructing isthmus. In method B, on the other hand, the fundus is first reduced, and, as a result, two rings of uterine tissue have to pass through the isthmus at the same time.

If manual reduction fails, and the patient has not reached the menopause, and hence it is advisable to preserve the uterus if possible, various operative proceedings have been recommended with the object of directly dilating the constricting isthmus. The operation, which appears to be at once the safest and to offer the best chance of success, consists in making an opening from the vagina into Douglas' pouch, then incising the constricting isthmus, and then reducing the body through the widened passage thus obtained, finally closing the incision in the isthmus by sutures.

(3) **Extirpation.**—Extirpation of the inverted uterus, is the treatment indicated in the presence of a tumour which cannot be removed without permanently damaging the uterus, or which is found to be malignant. It is also indicated, in women who have passed the menopause, in preference to too violent attempts at reposition, and in young and middle-aged women in whom Küstner's operation has failed. It is usually carried out by the vaginal route, unless the abdomen is already open for any other reason, or unless there is malignant disease present.

CHAPTER VIII.

DISEASES OF THE UTERUS (*continued*).

Traumata of the Uterus. Inflammatory Diseases of the Uterus—Corporeal Metritis :
 Acute : Chronic, Myometritis, Endometritis—Cervical Metritis : Acute, Chronic ;
 Tuberculosis of the Uterus ; Varieties, Diagnosis, Treatment. Operations :
 Curetting—Amputation of the Cervix—Trachelorrhaphy.

TRAUMATA OF THE UTERUS.

TRAUMATA of the uterus may occur during parturition. The commonest is laceration of the cervix, a condition which is associated with endometritis and endocervicitis. It will be discussed in the chapter on “Traumata of the Genital Organs.”

INFLAMMATORY DISEASES OF THE UTERUS.

Inflammatory conditions of the uterus, and also certain conditions which in the present state of our knowledge it is convenient to classify as “inflammatory,” are usually included under the one term *metritis* (*μήτρα*, the womb), or inflammation of the uterus. This may be subdivided as follows :—

Metritis	{ Corporeal	{ Acute	{ Myometritis.
		{ Chronic	
	{ Cervical	{ Acute	{ Endometritis.
		{ Chronic	

CORPOREAL METRITIS.

Corporeal metritis, that is metritis of the body of the uterus, is met with in two varieties :—

- I. Acute corporeal metritis.
- II. Chronic corporeal metritis.

I. ACUTE CORPOREAL METRITIS.—Acute corporeal metritis may be subdivided into myometritis and endometritis—according as it attacks the muscular wall or the endometrium—if it is thought well to do so. As, however, the two conditions probably always co-exist, such a course seems unnecessary. It will accordingly be discussed under a single heading.

Ætiology.—Acute metritis is the result of infection of the uterus with pyogenic organisms. It occurs most frequently as the result of gonorrhœal infection, or of septic infection occurring during or after parturition, or during operative interference with the uterine cavity. Acute metritis may also occur during the course of severe attacks of the eruptive fevers.

Pathology.—The acute septic metritis, which occurs during the puerperium, is usually due to a virulent streptococcal or staphylococcal infection. It may start at any part of the inside of the uterus, and usually remains localised to the area first infected. The interior of the



FIG. 68.—Uterus removed from a patient who died of acute streptococcal infection. 1. Left Fallopian tube. 2. Left ovary. 3. Os externum. 4. Right ovary. 5. Right Fallopian tube. (From the author's "Manual of Midwifery.")

uterus is quite smooth, the wall as a whole is firm, and it is evident that there has been no marked destruction of tissue (v. Fig. 68). There is consequently no tissue which could be removed by the curette.

Microscopic examination of the endometrium in these cases shows the nature of the changes which are present. There is superficially a thin layer of necrosed cells blended with fibrinous exudate, to which the unnatural smoothness is due. Immediately below this, in the deeper layers of the endometrium, there is a slight degree of leucocytic infiltration (v. Fig. 69), which, in amount, is in marked contrast with what we see in putrid endometritis. Both towards the surface and in the leucocytic zone, cocci are present in large numbers (v. Fig. 70), and they can be also found in the lymph channels which pass through the

muscular walls towards the peritoneal surface. The entire appearance points to an attack so rapid that the usual tissue resistance to bacterial invasion has not had time to occur.

In cases of less virulent infection, the uterus is large, its wall thickened, and its tissue friable. The surface shows more marked changes than in the acute septic variety, but there is not as much destruction of tissue as in putrid endometritis. The exudate is purulent and often bloody, and consequently the lochia are increased in quantity. There are, in fact, the usual results of a severe catarrh with



FIG. 69.—Puerperal endometritis due to streptococcal infection, showing how slight is the development of the leucocytic wall. (William^s)

a purulent exudate. In some cases, the exudate contains a larger number of cells than does ordinary pus, and a distinct false membrane, lining some portion of the interior of the uterus, appears. To this condition the term "diphtheritic endometritis" was formerly applied, and it was described as a distinct variety. There is, however, no justification for such a distinction, as a line cannot be drawn between it and the other conditions described.

In many of the cases of this class, the colon bacillus is present, either alone, or more commonly as one element of a mixed infection. When it is present, the lochia are foul-smelling, and may be frothy owing to the production of gas; putrefactive organisms are also frequently

present in the uterus. The toxins produced by them facilitate the advance of the parasitic organisms into the uterine walls, or, in other words, the presence of a decomposing fluid adds virulence to comparatively inactive pyogenic germs.

Occasionally, a very mild form of septic infection occurs without any general symptoms of importance. In such cases, the inflammation is in the form of a slight catarrh, and in puerperal cases the lochia

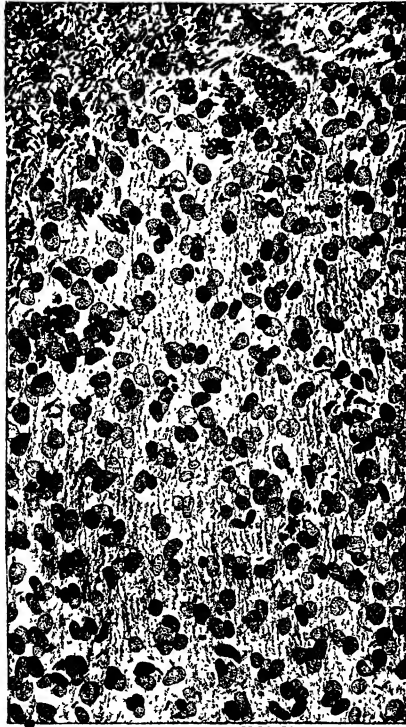


Fig. 70.—Streptococcal endometritis, showing bacterial invasion of leucocytic wall. $\times 800$. (Williams.)

are at first diminished, but afterwards increased. This form may result from direct extension of a catarrh of the vagina. Some of these cases present a close resemblance to the diphtheritic form just mentioned.

In most cases of endometritis of septic origin, an extension of the infection into the muscular coat of the uterus occurs. Such a metritis is not a separate condition, but is merely an extension of the infective process already described. In some cases, however, a metritis of a different kind occurs. During their passage through the lymphatics of the uterine wall, bacteria may become lodged at any point, and there

give rise to isolated foci of inflammation, possibly resulting in abscess formation, either in the muscle, or, more frequently, between the muscle and the peritoneal covering.

In acute gonorrhœal infection, the changes present are akin to those met with in the milder forms of septic infection.

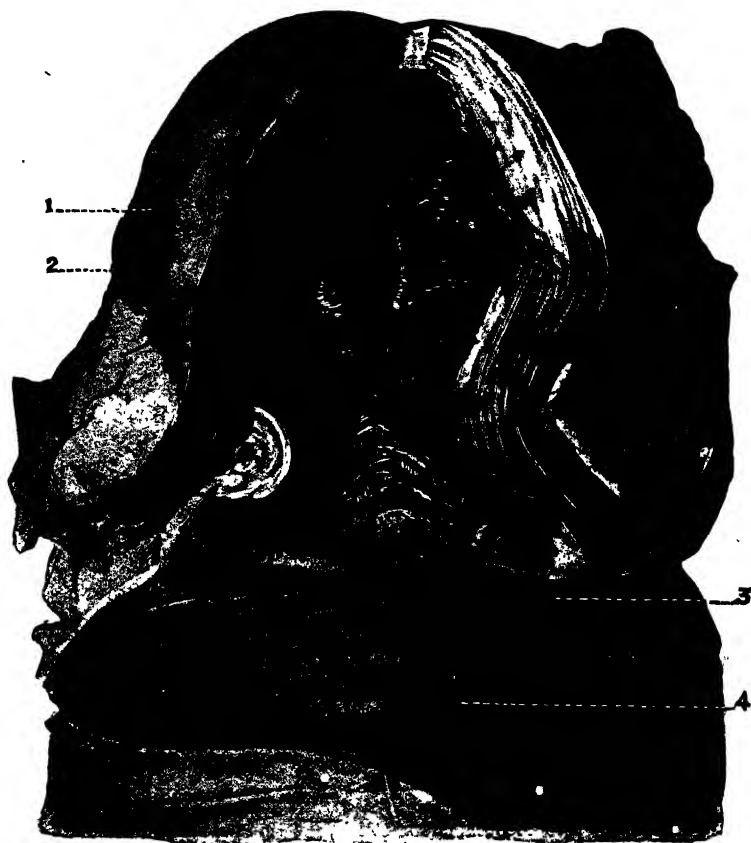


FIG. 71.—Uterus removed from a patient who died of mixed septic and saprophytic infection.

1, Fallopian tube; 2, ovary; 3, os externum; 4, vagina. (From the author's "Manual of Midwifery.")

Complications.—The great danger of acute metritis is that of extension of the infection beyond the uterus, either by travelling directly through the uterine wall to the parametrium or the peritoneum, or along the tubes to the peritoneal cavity. If the parametrium is infected, a cellulitis results, which may extend right round the uterus or may be limited to one or other side. In such cases a serous exudate is poured out into the parametric tissues, and this can be felt as a hard

mass in which the uterus is apparently embedded. In some cases the infection is gradually overcome and the exudate is absorbed, but in other cases an abscess forms, which may burst into any of the neighbouring viscera, into the peritoneal cavity, into the vagina, or externally.

If the tubes are infected a septic salpingitis results, and in many cases the infection extends onwards into the peritoneal cavity. Here, as a rule, an adhesive peritonitis glues the pelvic peritoneum together, and prevents the extension of infection beyond the pelvic cavity. This is the most frequent termination of such cases, and is the cause of subsequent adherent retro-deviations, fixed ovaries, and pyosalpinx. If, however, the virulence of the infecting organism is considerable, extension may occur before adhesions have time to form, and a general septic peritonitis results.

Another and a most serious consequence, which may follow septic endometritis, is the formation of septic thrombi in the uterine sinuses. If this occurs, the thrombus may break down, and the particles be set free in the blood-stream and carried to other parts of the body, or the thrombosis may extend outwards into the uterine or ovarian veins, and thence into the internal iliac veins or even into the inferior vena cava. In such cases a general pyæmic infection will result. Another still more serious consequence is the extension of infection along the lymphatics, giving rise to acute lymphatic sepsis.

Symptoms.—The uterus is slightly enlarged, and is very tender. A more or less profuse purulent discharge escapes from the cervix, save in cases of streptococcal puerperal infection, when there is often a cessation of all discharge. The temperature is high, reaching from 103° F. to 105° F. The pulse is very rapid, and may range from 120 to 140. There are the general symptoms of septic absorption, or of actual acute sepsis. The patient may complain of intense pain over the uterus, and, if the infection extends beyond the uterus, there are the symptoms of peritonitis.

The extension of the infection beyond the uterus into the tubes, the parametrium, or the general peritoneal cavity is shown by the occurrence of intense pain over the lower part of the abdomen, and by a further rise in the temperature and pulse-rate. The severity of the pain is proportionate to the formation of adhesions, and in those cases in which a general infection of the peritoneal cavity occurs, pain may be almost or entirely absent. Its occurrence, therefore, is a favourable sign, as showing the limitation of the infection. The occurrence of rigors usually points to the presence of thrombosis either in the uterine sinuses or the pelvic veins, and to the passage of infected emboli from these thrombi into the general circulation. The presence of inflammatory exudates, or of collections of pus in the tubes or pelvic cavity, can

be determined by bimanual examination, and by palpation of the lower part of the abdomen, and the presence of pelvic thrombosis can also be similarly detected in favourable cases.

Treatment.—The correct treatment of local septic infection of the genital tract after delivery is still the subject of discussion. In deciding upon the course to adopt we should be guided by the condition of the interior of the uterus. If the endometrium is shaggy, and small portions of retained placenta, membranes, and decidua are adherent to it, they should be gently removed with the finger or with a blunt curette, and the uterus then plugged with iodoform gauze. This plug must be removed at the end of twelve hours, and, if necessary, a fresh one inserted after douching out the cavity. If, on the other hand, the inside of the uterus is quite smooth, a condition which is found in the most acute forms of streptococcal infection, curetting is contra-indicated, and the douche and the plug are probably useless. In these, and indeed in all forms of local septic infection of the uterus, we should be inclined to inject repeatedly a strong solution of formalin (from twenty to forty per cent.) into the uterine cavity. The formalin should be quickly injected in sufficient quantity to ensure its reaching the entire surface of the endometrium, *i.e.*, from two to four drachms, and washed out after fifteen to thirty seconds have elapsed. The penetrating power of formalin is considerable, and our experience of its use in non-puerperal cases leads us to believe that, injected in the manner we have described, it would not produce any harmful effect upon the patient, and would exert a deterrent effect on the development of the invading micro-organism.

In some cases hysterectomy may be of use, but it is necessarily a very serious operation when performed on a septic patient. Where there is septic thrombosis of the pelvic veins, their excision or ligature has often been successful in curing the pyæmia. • Naturally the larger the veins, or the greater the number of veins involved, the more serious is the operation, and consequently the prognosis. Thus, while cases of septic thrombosis of one ovarian vein can usually be successfully treated, cases of thrombosis of both internal iliacs are almost hopeless.

If general septic peritonitis occurs, the only treatment of any avail is the immediate opening of the abdomen and the flushing out of the peritoneal cavity with normal saline solution, followed by free drainage through the abdominal wall and through the vagina.

The constitutional treatment of local septic infection consists in the maintenance of the patient's strength in every way possible, with the help in some cases of such drugs as iron, strychnine, and digitalis when the condition of the heart necessitates its use. The administration of ergot is also indicated, with the object of

promoting uterine contraction, and so lessening the absorption of toxins from the uterus. Regular action of the bowels must be secured. If pain is a prominent symptom, hot stupes should be applied to the hypogastrium, and hot vaginal douches given. In these cases the use of suitable vaccines, either alone or in combination with sera, is most important. The method of administering them, which has been adopted in the Rotunda Hospital, is as follows :—In the great majority of cases bacteriological examination of the fluid removed from an infected uterus shows the infecting organism to be either *Streptococcus pyogenes* or *Staphylococcus aureus*, though occasionally other pyogenic organisms may be found. As soon as the diagnosis is made, one should administer a stock vaccine of the organism found, obtained from a trustworthy maker of such vaccines. In streptococcal infections a suitable initial dose is 5,000,000 cocci, in staphylococcal infections 25,000,000. These inoculations are repeated every second or third day, until recovery results. If the doses given appear to produce some, but an insufficient, reaction, they may be doubled or increased still further. In streptococcal infection the effect of the vaccine may be increased by the simultaneous use of anti-streptococcic serum.

It not infrequently happens that the administration of a stock vaccine produces insufficient results. It is then necessary to employ an autogenous vaccine, *i.e.*, one made from the organism isolated from the patient herself. It is therefore wise in every case to try to obtain as quickly as possible a pure culture from the uterine lochia, from which a vaccine can be made when necessary.

Vaccines are given by hypodermic or intra-muscular injection. The back of the fore or upper arm may be chosen, and strict aseptic precautions must be observed.

The use of alcohol in septic infection has been abandoned, except in small quantities when a cardiac stimulant is required. Strychnine may also be given, either hypodermically or by the mouth, with a similar object.

Extreme elevation of temperature must be treated by sponging with cold or iced water. Chemical antipyretics are, as a rule, harmful. Good results have been obtained by the injection of normal saline solution either into the rectum, the sub-mammary tissue, or the veins. In the case of the last two methods from one to three pints may be injected at the time, and the injection repeated at intervals of twelve hours. Where the saline is injected into the rectum it must be given very slowly, at the rate of from half to one pint in the hour, and continued as long as the rectum tolerates it.

In acute gonorrhœal metritis, if the infection is limited to the cervix, the latter should be well wiped out with small pieces of cotton wool

twisted round the end of a probe, and then treated with one or other of the different antiseptics which are known to exercise a germicidal effect on the gonococcus. Perhaps the best of these is protargol, used in a two to five per cent. solution. It may be applied at intervals to the cervical canal through a speculum, or, as suggested by Reed, the cervical canal may be plugged with a small piece of gauze soaked in the protargol solution. If the uterine cavity is also infected, it may be plugged with a similar piece of gauze. As protargol has a powerful bactericidal effect on the gonococcus, the danger of causing an extension of the infection need not be feared, as any micro-organisms coming into contact with the protargol will be killed. The gauze should be changed every forty-eight hours. When the acute stage of the infection has passed off, the infected mucous membrane should be removed with the curette, and the cavity again treated with protargol. In metritis, the result of acute infective fevers, treatment as a rule is not indicated during the acute stage. Later, if the condition becomes chronic, it should be treated by curetting, etc.

II. CHRONIC CORPOREAL METRITIS.—Chronic corporeal metritis must be subdivided into two forms according to the part of the uterine body it attacks :—

(A) Chronic myometritis.

(B) Chronic endometritis.

Chronic Myometritis.—Chronic myometritis is the term applied to chronic metritis involving the muscular coat of the uterus, as opposed to chronic metritis involving the endometrium. Myometritis is so closely connected with endometritis that it is doubtful whether it should be classified as a separate condition. Endometritis may occur without any obvious accompanying myometritis, but the only cases in which myometritis occurs without an antecedent endometritis are in the rare instances in which it results from the extension of neighbouring extra-uterine inflammation. On account of the extremely intimate connection between the endometrium and the muscular coat of the uterus, infection of the former is almost certain to extend into the latter. If the extension is slight, it is masked by the symptoms of the accompanying endometritis, but if it is considerable, the existence of myometritis as a distinct condition can be determined.

Ætiology.—Chronic myometritis occurs most frequently as the result of the extension of chronic endometritis, and, more rarely, of peri- or parametritis, and consequently their causation is alike. It is also regularly found as a cause, or as a consequence, of subinvolution of the uterus after delivery.

Pathology.—The pathological changes in chronic myometritis following chronic endometritis are not well marked. They may be

Plate II.



The normal mucous membrane of the uterine body. X 30. (Jolly).



The different epithelia met with in the uterus. Above, epithelium of body. Below, epithelium of vaginal portion of cervix. On the right, epithelium of cervix. X 140. (Jolly).

summarised as follows:—The uterus is considerably enlarged, and this increase affects all its diameters. There is a considerable general hypertrophy of the muscular and connective tissue elements of the wall, the connective tissue being increased slightly more in proportion than is the muscle. The endometrium is almost invariably increased in thickness, and exhibits various changes in the glands.



FIG. 72.—Partial resection of the uterus. A wedge-shaped piece, *a*, has been cut out of the body of the uterus, the walls of which are then approximated by suture.

Symptoms.—The uterus is enlarged, and tender to the touch. In the early stages its normal elasticity is still present, but later it becomes firm and rigid. It is frequently retroverted, and, if it is anteverted, the normal antelexion is absent, a condition which is due to its increased rigidity. The subjective symptoms are those of the accompanying endometritis,—sacral pain, weight and tenderness in the pelvis, and various menstrual disorders. Of the last, menorrhagia is the most common, and more rarely metrorrhagia also occurs, while dysmenor-

rhœa occurs in about a third of the cases. It sometimes happens that the amount of blood lost during the periods is so excessive as to cause actual danger to the life of the patient. The uterus is much enlarged, and, if it is in a position of anteversion, there may be irritability of the bladder owing to the pressure of the heavy fundus.

Treatment.—The treatment of chronic myometritis is in the main the treatment of the endo-, peri-, or parametritis which causes it, and

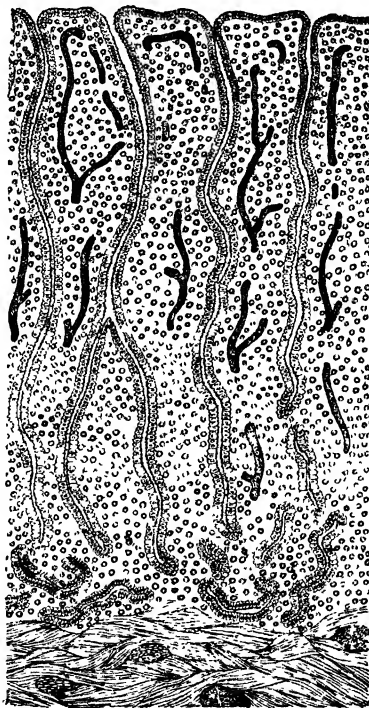


FIG. 73.—Diagram of the structure of the normal endometrium at right angles to the surface. Slightly enlarged. (Wyder.)

this will be described in due course. If the uterus is much enlarged, involution may be hastened by the amputation or by the excision of a wedge-shaped portion of the cervix. If hæmorrhage is a constant symptom, and cannot be checked by curetting, more radical measures must be adopted. In such cases, hysterectomy is the usual and, we think, the most satisfactory treatment. As an alternative, the resection of a large part of the central portion of the uterus, with the object of reducing the size of the cavity, has been successfully practised.

Chronic Endometritis.—Chronic endometritis (ἐνδον, within; μήτρα) is the term applied to corporeal metritis when it attacks the endo-



FIG. 74.—Glandular endometritis. The glands are much dilated, the epithelium remaining normal. $\times 80$. (*Wigham.*)



FIG. 75.—Glandular endometritis. The glands are much hypertrophied, showing great increase of epithelium which forms tufts protruding into the glands. There is little interstitial tissue. $\times 80$. (*Wigham.*)

metrium. It is one of the most common, or perhaps the most common, of gynæcological diseases, and it is so closely connected with many other of these diseases that in treating them measures must also be taken for its cure.

Ætiology.—The causes of chronic endometritis are by no means as definitely ascertained as they ought to be, and even when we discover a cause, the manner in which it brings about its effect is uncertain. Some writers attribute all forms of chronic as well as of acute endometritis to bacterial action. This is a difficult point to prove, as, in many cases, it is impossible to trace any connection between the onset of the endometritis and the occurrence of bacterial invasion. Also, in the greater number of cases of chronic endometritis, it is impossible to demonstrate the presence of any micro-organism. On the other hand, there is good reason to believe that bacteria may lie in a quiescent condition in some part of the genital tract, waiting for favourable circumstances which will permit their development. And, furthermore, it is quite possible that a bacterial invasion of the uterus may take place, and set up a metritis, and that later the invading bacterium may disappear, leaving behind it the effects of its visit.

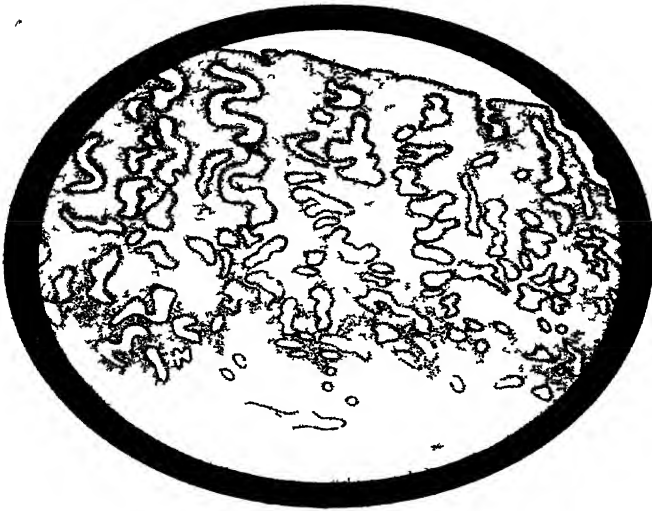
Neither the results of pathological research, nor the preventive or remedial treatment of endometritis, fully justify the hypothesis that all cases of so-called endometritis are due to a bacterial infection. Pathological investigation has failed in many cases to decide whether the presence of bacteria was the result or the cause of the endometritis; as yet we have found it impossible by any methods for the mere prevention of bacterial infection to ward off attacks of endometritis; and, in treatment, the best results have followed from dealing not only with the bacterial infection but also with the conditions which produce mechanical congestion of the uterus. It is possible that in the future, as our knowledge increases, we shall be able to establish on a surer basis the bacterial theory, but at present, for practical purposes, we must assume that endometritis is due to the co-operation of two causes,—bacterial invasion, and congestion of the uterus:—

- (1) *Bacterial Invasion.*—Gonorrhœal, tuberculous, septic, saprophytic, diphtheritic, and syphilitic infection, infection by fungi, and infection by amœbæ.
- (2) *Congestion of the Uterus.*—Uterine displacements, malformations, tumours, and traumata; subinvolution; tumours of the adnexa; excessive coitus; constipation; cardiac, pulmonary, and renal disease.

Either bacterial invasion or congestion of the uterus may be primary, but each is generally associated with the other, and together they produce one or other of the forms of endometritis described below. Prophylactic measures must be directed to the prevention of both, and curative measures to their removal, and to the removal of their results, which in themselves are further exciting causes.

Varieties.—The difficulties of classifying the varieties of endometritis,

Plate III



Glandular endometritis X 30. (Jolly).



*** Interstitial endometritis. X 30. (Jolly).**

in a suitable and correct manner, are considerable. Of the many classifications which have been adopted we prefer the following, though at the same time we recognise that in many respects it is unsatisfactory :

- (1) Glandular endometritis.
- (2) Interstitial endometritis.
- (3) Mixed glandular and interstitial endometritis.

These so-called varieties may be only different stages in the course of the same condition.

Pathology.—Macroscopically, in all three forms, the uterus is enlarged



FIG. 76 —Cystic endometritis, seen under the high power.

and congested ; the mucous membrane is as a rule thickened, injected, and covered with small prominences and inequalities ; and, if the endometritis is of long standing, the muscular coat shows the lesions already described under the head of chronic myometritis.

Under the microscope, the predominant features of the form of endometritis with which we are dealing are to be seen. In glandular endometritis, there is dilatation of the capillaries and numerous small hæmorrhages, the epithelial and stroma cells become cedematous, and the uterine glands are hypertrophied and their number and ramifications are increased, so that the section resembles that of an adenoma (v. Figs. 74, 75). To this condition the name *adenomatous endometritis* has also been given. The condition known as *cystic endometritis* is probably a further development of adenomatous endometritis. In it

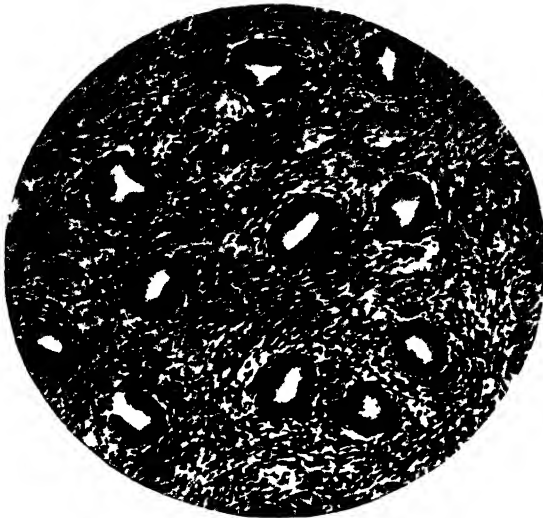


FIG. 77.—Interstitial endometritis. The connective tissue is dense, showing many cell nuclei, and the glands are small. $\times 80$ (Wigham.)

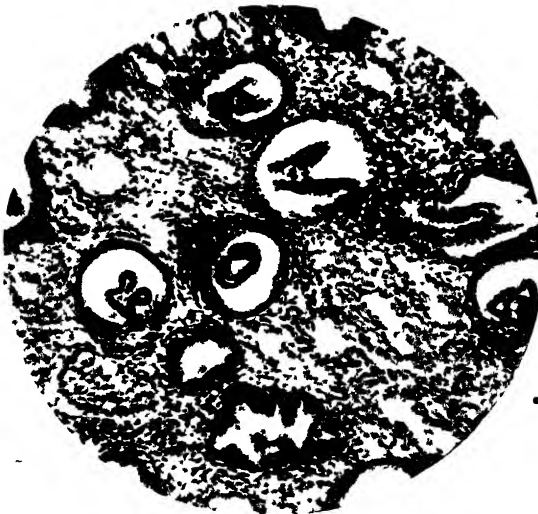
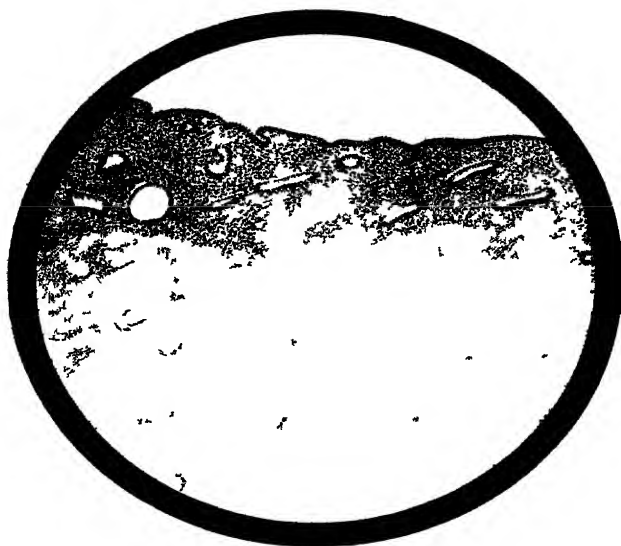


FIG. 78.—Mixed glandular and interstitial endometritis. The glands are dilated and the epithelium hypertrophied, forming invaginations into the glands. The interstitial tissue shows dilated vessels, and is infiltrated with blood. $\times 60$. (Wigham.)

numerous glands become dilated, so that a section of mucous membrane is honeycombed with cavities. In some of these cases there is such marked proliferation of the mucous membrane that polypoid projections form all over its surface.

Plate IV.



Atrophic senile endometritis. X 30. (Jolly).



Cystic endometritis with polypus formation. X 5. (Jolly).

In interstitial endometritis, the connective tissue becomes infiltrated with numerous small round cells, and is denser than normal (v. Fig. 77). The capillaries are dilated, and some are ruptured. In a later stage, spindle-cells appear in the endometrium, and, as a result, the glands are so compressed that they atrophy, and in the end almost or entirely disappear, a final condition which is known as atrophic endometritis.

In the mixed form, hypertrophy and hyperplasia of the glands occur, accompanied by a round-celled infiltration of the connective tissue (v. Fig. 78). At a later stage, as the infiltration increases the glands become atrophied and finally disappear.

In any of the foregoing forms, the endometrium may become necrotic, presumably owing to limitation of its blood supply, or to its separation from the underlying muscular coat by an effusion into its deeper layer. It is probable that the condition known as senile or adhesive endometritis is associated with this change and is the result, first, of a necrosis of the endometrium, and, secondly, of an absence of the normal attempts at reconstitution of the latter owing to the age of the patient and the fact that her sexual life is over. As a consequence of these two factors, the uterine wall is practically uncovered by epithelium, and in some cases its opposing surfaces become adherent to one another. In other cases an infection by pyogenic bacteria occurs, and pus forms and collects in the uterine cavity, constituting the condition known as pyometra.

Symptoms.—The symptoms of endometritis must be divided into those which are due to the local condition, and those which are due to accompanying constitutional disturbances.

(A) *Local Symptoms.*—The local or uterine symptoms consist in menstrual disturbances of various kinds, in the occurrence of leucorrhœal discharge, and in the general pelvic discomfort and pain associated with the enlargement of the uterus and the retro-deviation which are also so commonly present. The menstrual disturbances consist most usually in the occurrence of menorrhagia, and sometimes metrorrhagia, especially in the early stages of interstitial endometritis. More rarely, scanty menstruation or amenorrhœa is met with, while very intractable hæmorrhage often occurs during the whole course of a cystic endometritis. Amenorrhœa, as a rule, only occurs in cases in which previous menorrhagia has reduced the patient to a condition of profound anæmia and in cases of atrophic endometritis (i.e., the last stage of interstitial endometritis). In some cases, portions of detached endometrium, or even entire casts of the interior of the uterus, are expelled at the menstrual periods. This constitutes the so-called exfoliative endometritis.

Leucorrhœa is usually present in all varieties, but it is especially

profuse in the glandular form. In the other forms, the source of the discharge is most probably the cervical glands, which are involved in an accompanying endocervicitis. In senile endometritis, there is usually a serous and blood-stained discharge, which becomes foetid if the interior of the uterus is infected.

Pain in varying degree is a very common symptom. It comes and goes, being made worse in frequency and degree by prolonged standing or walking, or over-exertion of any kind. It is referred to the iliac fossæ, the back, especially the lumbar region, and the perinæum. Frequently, it occurs as dysmenorrhœa, especially in exfoliative endometritis.

General pelvic discomfort is caused by the increase in size of the uterus and the frequent presence of displacements. It consists in a feeling of weight and fulness in the pelvis, and a "bearing-down" sensation.

Lastly, sterility is often the result of chronic endometritis, and is due either to the diseased endometrium offering an unsuitable nidus for the reception of the ovum, or to the pathological secretion of the uterine and cervical glands proving fatal to the spermatozoa.

On examination of the patient, the uterus is found to be somewhat enlarged, especially in glandular and hæmorrhagic endometritis, and the size and length of its cavity are increased. The uterus may be much softer than normal, or on the other hand it may be much firmer. The latter condition is specially met with in association with very chronic myometritis. The uterus is usually more tender than normal, in proportion to the acuteness of the inflammation. Its mobility is not affected, unless the condition is accompanied by the presence of pelvic adhesions or parametritis. Its position is not necessarily altered, but in many cases retro-deviations are present, owing to the increase in size of the uterus and the relaxation of the ligaments. The cervix is very commonly hypertrophied, and there may or may not be an erosion.

(B) **General Symptoms.**—The general constitutional symptoms, arising as the result of chronic endometritis, vary greatly in different subjects. They consist in permanent or fugitive ill-defined pains, dyspepsia, cardiac palpitations, neuralgias, migraine, and symptoms of rectal and vesical irritation. Anæmia is often present in those forms which are associated with menorrhagia and metrorrhagia. In some patients, symptoms are observed at intervals arising from the absorption of bacterial products from the uterus, and consisting of shivering, vomiting, headache, debility, and slight jaundice.

Treatment.—The complete cure of chronic endometritis is often a very difficult matter. The rational treatment, and the only one which gives any good results in very chronic cases, consists in :—

- (1) The removal or cure of any condition which tends to keep the uterus in a state of congestion.
 - (2) The removal of the diseased endometrium.
 - (3) The adoption of such measures as will ensure the growth of a healthy endometrium.
 - (4) The improvement of the patient's general health.
- (1) The measures directed towards the removal or cure of those

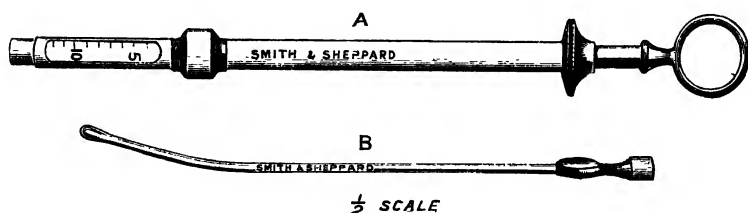


FIG. 79.—Braun's syringe for injecting fluids into the uterine cavity.
A. Syringe. B. Nozzle.

conditions which tend to keep up the congestion of the uterus consist in :—the cure of displacements ; the removal of tumours of the adnexa or of the uterus ; the cure of cervical lacerations, or erosions ; the relief of chronic constipation ; and the prevention of too frequent coitus, or of coitus at all in some cases.

(2) The removal of the diseased endometrium is best and most quickly brought about by curetting the uterus and injecting caustics.

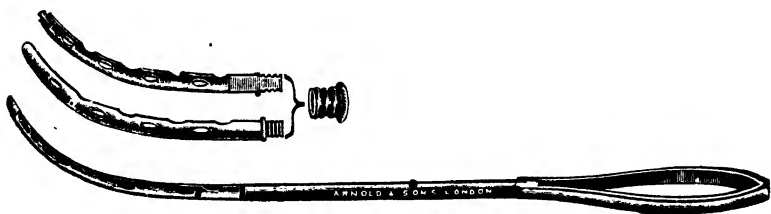


FIG. 80.—Bandl's hollow sound—author's modification, the end of which can be divided into two for cleaning.

In some instances, it may be thought preferable to trust alone to the injection of caustics ; but, except in mild cases, the relief which this proceeding affords is not so rapid or so complete as is that afforded by curetting. The caustics, which are most usually injected after curetting in these cases, are as follows :—Chloride of zinc (50 per cent.), iodised phenol (iodine 1, liq. carbolic acid 3), tincture of iodine, and liquid carbolic acid. The first three are injected by means of Braun's syringe (v. Fig. 79) ; the last is best applied by means of a sound wrapped round with cotton wool.

We personally dislike the caustics mentioned, and do not use

them, preferring formalin for the reasons which follow. Chloride of zinc sometimes acts more energetically than we desire, and may cause almost complete destruction of the endometrium and the endocervix, leading to cessation of menstruation and to stenosis, or even atresia, of the cervix. Iodised phenol has a most unpleasant smell, and tends to block the small holes in an intra-uterine syringe. Tincture of iodine is not sufficiently strong, and liquid carbolic acid is probably too strong. Formalin (40 per cent. formic aldehyde) is preferable to any of the foregoing. It may be used at a strength of from twenty per cent. up to full strength, and can be readily injected with Braun's syringe. As in some cases it causes considerable pain, it is well that the patient should be under an anæsthetic. If she is conscious, formalin must be injected with great care. In such cases we may begin by injecting a couple of drops of a twenty per cent. solution, and then gradually increase the strength on subsequent occasions. Formalin should be allowed to act for from fifteen to thirty seconds, according to the manner in which it affects the patient, and must then be removed by washing out the uterus through a Bozemann's catheter.

In mild cases of endometritis, it is sometimes found sufficient to apply astringents, or mildly caustic solutions, to the endometrium by means of Bandl's hollow sound (*v.* Fig. 80). This instrument is used as follows:—The vagina is well douched, and a cylindrical speculum of the largest size which can be introduced is passed into the vagina, and rotated until the cervix projects into its upper orifice. The anterior lip is then caught in an American forceps, and the hollow sound is passed into the uterus. The speculum is filled with the solution which it is proposed to use, and the latter is carried into the uterus by partially withdrawing and again pushing up the sound several times. The solutions generally used for this purpose are pyroligneous acid, sulphate of copper (40 grs. to the ounce), nitrate of silver (20 to 30 grs. to the ounce), and formalin. The latter has many advantages, and may be used at a strength of a drachm to the ounce of water.

In endometritis due to gonorrhœal infection, a piece of gauze soaked in a two and a half to a five per cent. solution of protargol may be passed into the uterus, and allowed to remain there for twenty-four to forty-eight hours, and this procedure repeated several times.

In true hæmorrhagic endometritis and in cystic endometritis, curetting and the application of caustics may be tried, but it is usually found necessary to extirpate the uterus in order to check the hæmorrhage. Partial resection of the uterus may sometimes prove equally satisfactory.

(3) As has been mentioned, curetting is the best and most rapid method of removing diseased endometrium, but the treatment of the

case cannot be considered as finished once this operation is performed. Alone, it is not always sufficient to effect a cure, since, in addition to the removal of the diseased endometrium, it is necessary to ensure as far as possible the growth of a healthy endometrium. To obtain this result, it is sometimes necessary that the new endometrium should be again removed in part, or entirely, by the application of caustics. In cases of long-standing chronic endometritis, the application of formalin or of some of the above-mentioned drugs by means of Bandl's sound is necessary. The first application may be made a fortnight or so after the curetting, and it may be repeated some three times or oftener, according to the nature of the case, at intervals of a week or a fortnight. As a rule, however, if the accompanying complications of endometritis, such as erosions, displacements, etc., are cured, the symptoms of the patient completely disappear.

(4) The improvement of the general health of the patient is a matter of considerable importance. It can be effected in most cases by the regulation of the bowels, by increased and suitable nourishment, and by the judicious use of tonics. In many cases, absence from home is advisable, both for its general effect on the patient and as a means of preventing coitus for the time.

CERVICAL METRITIS.

Cervical metritis, like corporeal metritis, may occur in two forms :—

- I. Acute cervical metritis.
- II. Chronic cervical metritis.

I. ACUTE CERVICAL METRITIS.—Acute cervical metritis is a very rare condition, except in association with acute corporeal metritis. Occasionally, however, it occurs by itself.

Ætiology.—The ætiology of acute cervical metritis is practically the same as the ætiology of the acute form of corporeal metritis. Gonorrhœa is perhaps its commonest cause, in cases in which the cervix alone is attacked. In cases due to the invasion of septic micro-organisms, the entire uterus is usually affected. Septic infection most commonly occurs after parturition, more rarely after gynæcological operations.

Pathology.—The cervix is enlarged, œdematous, injected, the external os patulous, and the cervical canal slightly everted. If the inflamed surface is rubbed with the finger, slight bleeding occurs. In the septic form, there is usually a pseudo-membranous grey exudation covering the abraded areas. There is also a profuse and sometimes fœtid discharge. Similar changes are found in the glands and interstitial tissue as in acute corporeal metritis.

Symptoms.—If the body is infected as well, the symptoms caused by

the cervical condition will be obscured by those caused by the corporeal condition. If the cervix alone is affected, the symptoms will be similar to those caused by an acute vaginitis.

Complications.—The danger of acute cervical metritis is that the infection may extend to the uterine cavity, and so set up an acute corporeal metritis with its complications.

Treatment.—The treatment of these cases, if complicated by acute



FIG. 81.—Mucous polypi of the cervix.

vaginitis or corporeal metritis, will be the same as that of the complication. If it exists alone, it is treated by rest in bed and by the use of warm vaginal douches, insufflation of iodoform on the cervix, and the tamponing of the vagina with iodoform gauze or with plugs of cotton wool soaked in glycerine and ichthyol, and of the cervix with gauze soaked in a two and a half to five per cent. solution of protargo. The cervix may also be bathed in formalin (a drachm to the ounce of water) applied through a cylindrical speculum, and the formalin carried into the canal by means of a probe or sound covered with cotton wool.

II. CHRONIC CERVICAL METRITIS.—Chronic cervical metritis usually



Section through the edge of an early erosion. Note the manner in which the gland bearing mucous membrane is displacing the squamous mucous membrane, and the advance of the glands beneath the latter. X 16. (Jolly)



Papillary erosion of the cervix. X 8. (Jolly).

attacks all the tissues of the cervix, though as a rule the glandular and interstitial structures of the mucous membrane are the parts most involved, hence the condition is commonly known as *endocervicitis* (ἐῖδον, within; *cervix*, the neck).

Ætiology.—The cause of endocervicitis is usually to be found in a bacterial infection of the cervical glands. As we have already said, infection passing into the genital tract usually lodges first either in the



FIG. 82.—The so-called "erosion" of the cervix. (After Kelly)

region of the vulva or in the cervical glands. Sometimes, however, the endocervical changes may be secondary to endometritis.

Pathology.—The cervix is hypertrophied, and somewhat œdematous, and its lips are slightly everted. Under the microscope, similar changes to those in endometritis are seen, with the exception that there is a greater tendency to the formation of retention cysts—*Nabothian follicles*—owing to the mouths of the glands becoming obstructed. In some cases, these follicles force their way through the layer of cervical tissue which separates them from the surface, to which they remain

attached by pedicles, so forming mucous polypi (*v.* Fig. 81). So-called *erosions* of the cervix situated on the mucous membrane below the os externum are also very frequently present (*v.* Fig. 82). The name "erosion" gives a very false idea of the anatomical changes which are present in the majority of cases. It is not an erosion—in the true meaning of that term—but a change in the nature of the tissues, due to the

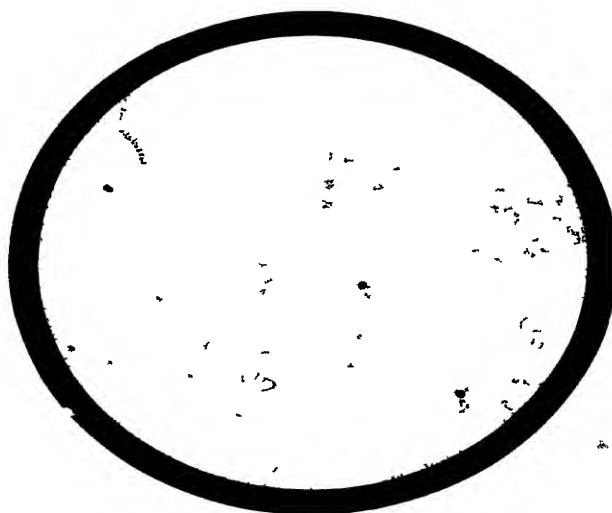


FIG. 83.—Erosion of the cervix. Sagittal section through the vaginal portion of a cervix on which an erosion has formed. *a*, Cervico-vaginal junction. *b*, Junction of squamous mucous membrane and gland-bearing mucous membrane. *c*, External os. Normally *b* and *c* should coincide, but owing to the erosion the gland-bearing mucous membrane extends beyond the external os.

downgrowth of the endocervical mucous membrane past the external os and on to the vaginal portion of the cervix. The latter is normally covered by squamous epithelium which disappears as the columnar-celled and gland-bearing mucous membrane grows down. In some cases a way is prepared for this downgrowth by the discharge which comes away from the over-active cervical glands, and which, constantly flowing over the squamous epithelium, washes it away, exposing an



Glandular erosion of the cervix. X 8. (Jolly).



Erosion of the cervix in process of "cure." Note the obstruction to the mouths of the glands by the ingrowing squamous mucous membrane. X 60. (Jolly).

unprotected surface underneath on to which the endocervical mucous membrane and glands grow. At a later stage these cervical glands proliferate, and, extending downwards, are found opening on to the altered patch of cervical mucous membrane. When seen under the microscope the altered tissue closely resembles the structure of an adenoma, and consequently the condition is sometimes described as an adenoma of the cervix. If the glands pass inwards perpendicularly to the surface

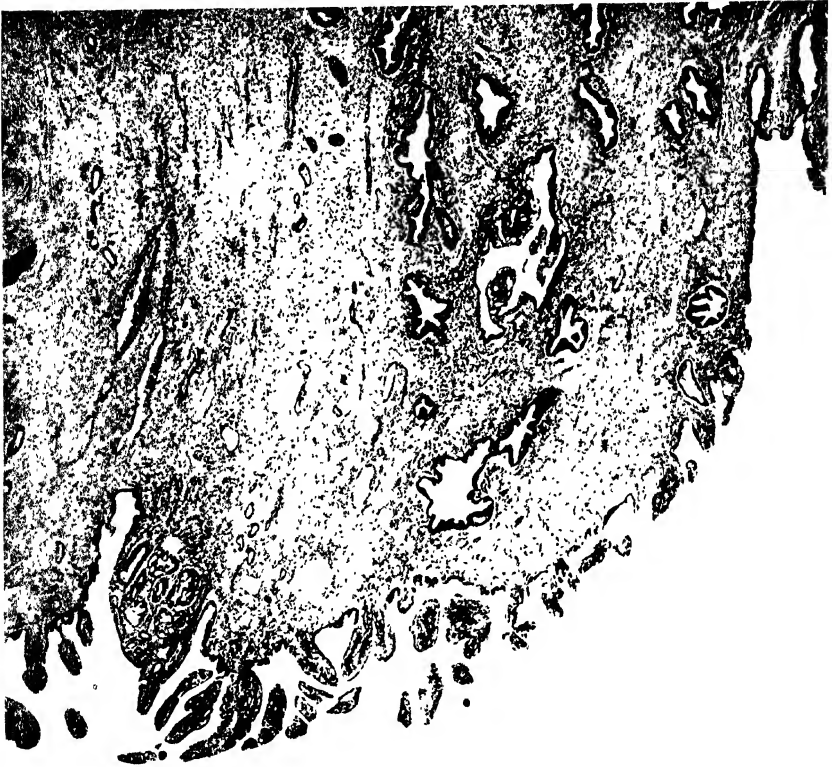


FIG. 84.—Erosion of the cervix. High magnification of the tissue round the external os in the cervix shown in Fig. 82.

of the cervix and are dilated, the tissue between them produces, under the microscope, a papillomatous appearance—papillary erosion. If the mouths of several of the glands become obstructed, leading to the formation of numerous small retention cysts, the condition is known as a follicular erosion. When the formation of follicles is associated with marked hypertrophy of the cervical tissue, the condition is known as follicular hypertrophy of the cervix. The growth thus formed may be so large as to reach the vulvar orifice. Occasionally, in very chronic cases, the layer of cubica

epithelium which covers the so-called erosion is destroyed, and thus a true erosion or ulceration occurs. Such a condition is commonly met with in cases of long-standing prolapse of the cervix.

A *mucous polypus* resembles, in its microscopical appearance, the tissue found in an erosion, save that the glands are more dilated, and in some cases are even altered into cystic cavities (v. Fig. 85).

Ectropion of the cervix is a very common cause of endocervicitis, and is frequently confused with erosion. Ectropion is the term

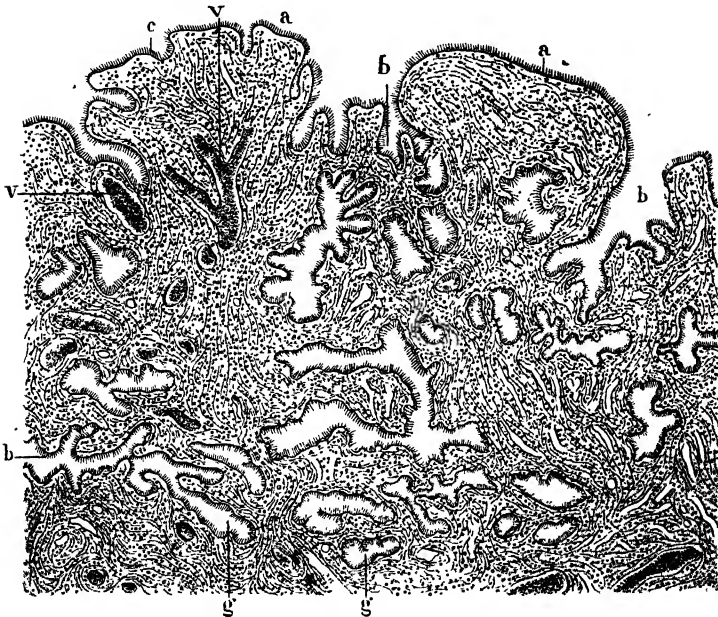


FIG. 85.—Glandular polypus of the cervix. Sections enlarged about 60 diameters. *a, a.* Superficial elevations on surface of polypus, covered by cylindrical epithelium. *b.* Depression between elevations, into which glands are opening. *g.* Deeper portions of glands. *v, v.* Blood-vessels. (*Cornil.*)

applied to the exposure of the cervical canal which results from deep laceration of the cervix, and the growth of endocervical mucous membrane over the torn surface (v. Fig. 86). Its appearance closely resembles that of an erosion, as, in both, the lowest portion of the cervix is composed of gland-bearing endocervical mucous membrane. In an erosion, this tissue extends beyond the os externum and invades the squamous mucous membrane covering the outer surface of the cervix. In an ectropion, it does not extend beyond the limits of the os externum and of the cervical laceration. It is obvious, however, that the two conditions can, and often do, co-exist.

When the glands in the case of erosion or ectropion have become

infected, there is always some absorption through the cervical lymphatics, and, if a careful examination could be made, bacteria would probably be found in the lymphatics and in the glands into which they drain. This causes a certain amount of inflammation in the tissues round the lymphatics, and round the hypogastric glands, and is probably responsible for the pain which is so often associated with both erosion and ectropion. It also helps to explain cases of pain and shortening of the utero-sacral ligaments, as these are the necessary

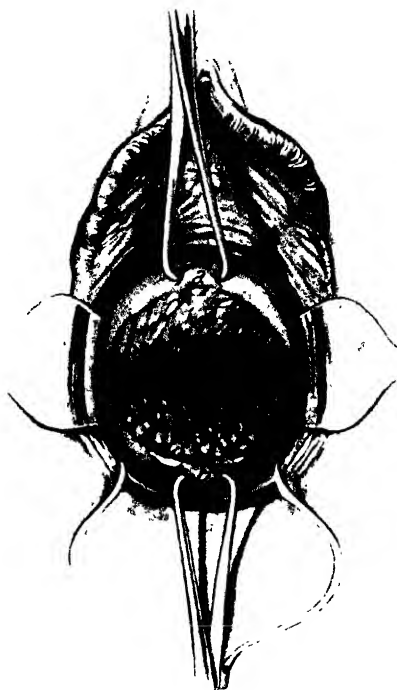


FIG. 86.—Ectropion of the cervix. If the points *a* and *b* are brought together the ectropion disappears.

consequences of infection in the lymphatics passing through them. In the course of a celiotomy one often sees a curious condition of the floor of Douglas' pouch, which can be explained in a similar manner. The peritoneum of the floor is thickened, and frequently a fold of it is carried some way up the posterior surface of the uterus, with the result that Douglas' pouch loses some of its depth and that the uterus is dragged backward by the tension of the fold. When such a condition occurs in association with tubal infection, there is no necessity to look further, but when it occurs quite apart from any form of tubal or ovarian infection, its origin is more difficult to explain. We think,

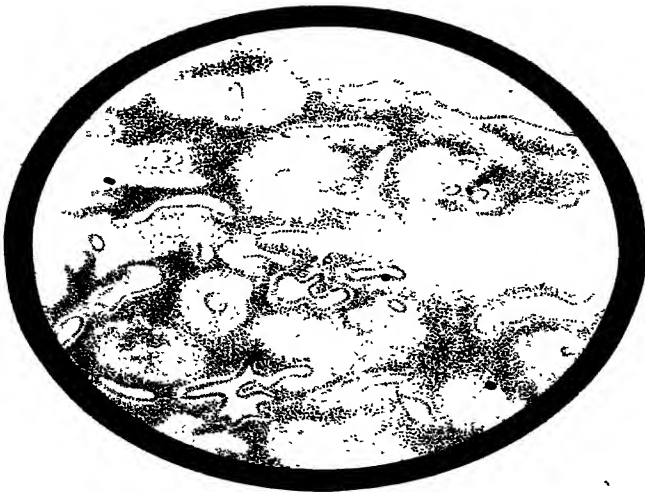
however, that in most cases it is correct to assume that it is the result of an ascending lymphatic infection coming from a focus of infection in the cervix, such as is found in cases of ectropion and erosion which have become the seats of a pyogenic infection.

Symptoms.—The cervix is enlarged and gaping, and a thick purulent or muco-purulent discharge issues from it. A papillary erosion imparts a curious velvety sensation to the fingers; a follicular erosion gives a sensation as if small grains of shot lay beneath the mucous membrane. If any of the follicles have become pedunculated, they may be felt protruding from the os. An ectropion is distinguished from an erosion by seizing the lips of the cervix in a bullet forceps, and bringing them together in such a manner as to restore the original shape. If the condition is one of ectropion alone, the inflamed cervical lining will disappear. If, however, it is an erosion, the altered patch of mucous membrane will still be visible. The subjective symptoms are similar to those of endometritis, save that menstrual disturbances may be absent, but as a rule there is a more profuse leucorrhœa, and there is frequently a constant aching pain in the back.

Treatment.—The treatment of these cases consists in the cure of accompanying endometritis and vaginitis, in the removal of erosions by the amputation of the vaginal portion of the cervix, and in the suture of cervical lacerations. It is sometimes thought advisable to attempt to cure erosions by means of the frequent application of caustics, but this is a most tedious process if there is much glandular proliferation. Moreover, in such cases, the treatment is unsatisfactory, as, although an apparent cure may be brought about, the latter is only superficial, and the glands remain in the cervical muscle. The ducts of these glands, however, are obstructed by the new growth of squamous mucous membrane, and so the glands themselves often become cystic, forming Nabothian follicles. As a result the cervix is hypertrophied and congested, and the symptoms of the patient, especially so far as pain is concerned, are often worse than before. Occasionally, one meets with cases which respond rapidly to the application of caustic, and in which one can see from week to week the gradual ingrowth of the squamous mucous membrane. In these cases, it is probable that there is little or no glandular hyperplasia, and that the altered appearance of the cervical mucous membrane is due to congestion and to the washing away of the superficial layer of squamous epithelium. The best caustic in these cases is perhaps pure liquid carbolic acid. Occasionally, erosion and ectropion will get well of themselves after a long time, a result which is brought about by the gradual atrophy of the glands, and by the accompanying ingrowth of the compound squamous epithelium over the denuded area. In all cases of erosion or follicular hypertrophy of the cervix, where the symptoms are sufficiently marked to



Benign mucous polypus of the cervix. X 8. (Jolly).



Tuberculous disease of the endometrium. X 50. (Jolly).

bring the patient under treatment, the only really satisfactory course is the amputation of the cervix, while in the case of extensive lacerations trachelorrhaphy is necessary.

TUBERCULOSIS OF THE UTERUS.

Tuberculosis of the uterus, as a primary condition, is a comparatively rare disease; it is more common as the result of extension from a tuberculous tube or ovary, or as part of a general tuberculosis.

Varieties.—It is found in three forms :—

- (1) An acute miliary form. This occurs as part of a general tuberculosis.
- (2) An interstitial form. This may occur in the uterine wall, and



FIG. 87.—Tuberculous mass in the wall of the uterus. Double tuberculous pyosalpinx

cause no symptoms until it manifests itself by some sudden and serious accident, such as rupture of the weakened uterus during delivery. On the other hand, it may give rise to pelvic pain and the general symptoms of pelvic infection.

(3) An ulcerative form. This is the most frequent form; in it the disease starts as small nodules in the endometrium or in the vaginal portion of the cervix. These nodules gradually coalesce and ulcerate, until finally the entire endometrium and endocervix are replaced by tuberculous tissue which in places is becoming caseous.

Diagnosis.—The symptoms of the patient in an early stage are those of endometritis. Later on, as the disease spreads, and the uterus becomes infected by other micro-organisms, the patient becomes hectic, and exhibits the general symptoms of a mixed tuberculous infection. If the uterus is curetted at an early stage, there may be no naked-eye

change in the endometrium. But, if the removed fragment is examined microscopically, typical tuberculous structure will be found. In later stages of the disease, when caseous changes are taking place, the existence of tuberculous lesions may be suggested by the appearance of the removed portions. Tubercle bacilli may be found in the sections and in the uterine discharges, but as a rule they are very few and difficult to find.

Treatment.—If it could be positively determined that the tuberculosis was entirely limited to the endometrium, it might be sufficient thoroughly to curette and cauterise the latter. It is, however, practically impossible to determine this, and consequently it may be necessary, when a diagnosis of tuberculosis is made, to remove the uterus.

When tuberculosis of the uterus occurs in a young woman in whom it is very necessary to save the organ, the patient may be kept under careful observation for a time, the ordinary hygienic treatment of tuberculosis being carried out, and injections of tuberculin administered at regular intervals. Examination of the uterus should be made from time to time, and, if there is any increase in the symptoms or any apparent extension of the disease in or beyond the uterus, hysterectomy must be performed.

OPERATIONS.

The following operations may be discussed here:—

- (1) Curetting.
- (2) Amputation of the cervix.
- (3) Trachelorrhaphy.

CURETTING.

Curetting, curettement, and curettage are the various terms applied to the operation by which the mucous membrane lining the uterus is removed, either for the purpose of diagnosis, or in order to cure some pathological condition.

Indications.—Curetting, as a remedial operation, is indicated in endometritis which does not rapidly respond to milder treatment. Curetting, as a diagnostic operation, is indicated whenever there is a continuous or often recurring discharge—either hæmorrhagic or purulent—the exact cause of which cannot be discovered by other means.

Instruments.—The following instruments are required:—Two American forceps; a posterior speculum; Hegar's dilators, or some modification of them; Bozemann's catheter; uterine sound; and at least two curettes, one for the fundus, the other for the sides of the uterus.

Of the many different forms of curette perhaps the most generally useful are Hegar's and Sims' flexible curettes (*v.* Figs. 88, 89). If a douche curette is required, Rheinstädter's is the most serviceable (*v.* Fig. 91). Hegar's curette is used for the sides; it will not curette

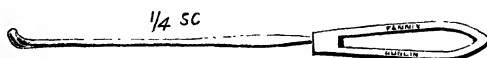


FIG. 88.—Hegar's curette.

the fundus. Sims' curette can be made to serve both purposes by altering the bend of the stem as is required. It will not remove as large pieces of mucous membrane for macro- or microscopical examination as will Hegar's.

Operation.—The operation of curetting is carried out as follows:—

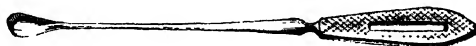


FIG. 89.—Sims' curette

Expose the cervix by passing a posterior speculum. Catch the anterior lip of the cervix with a bullet forceps, and draw it down (*v.* Fig. 9). If the cervical canal is not already dilated, dilate it up to the size of a No. 8 or 10 Hegar, and introduce a Bozemann's catheter and wash out the uterus. Then introduce whatever curette it is intended to

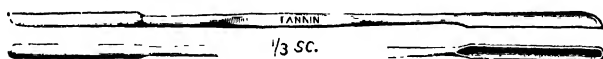


FIG. 90.—Martin's curette.

use on the sides of the uterus. We recommend for this purpose Hegar's curette, of the largest size that will pass through the cervix. Pass the curette up to the fundus, which will be recognised by the resistance it offers, and note the length of the uterine cavity. This is always an important preliminary to the operation, as it enables us



FIG. 91.—Rheinstädter's flushing curette.

subsequently to recognise at once if the curette passes through the uterine wall, an accident which is much more common than is generally supposed. The curette is then drawn downwards from the fundus to the inner os, with its cutting edge in contact with the endometrium. It is again passed up to the fundus, and drawn down in a similar manner over the uterine wall with just sufficient change of direction

to make it travel over fresh tissue. In this manner, the interior of the uterus is gone over systematically a couple of times, so as to ensure that no spots are left untouched. When the mucous membrane has been removed, the firm and contracted muscle fibres will impart a grating sensation to the curette as it travels over them, and in this way the operator will know that he has removed sufficient tissue. The

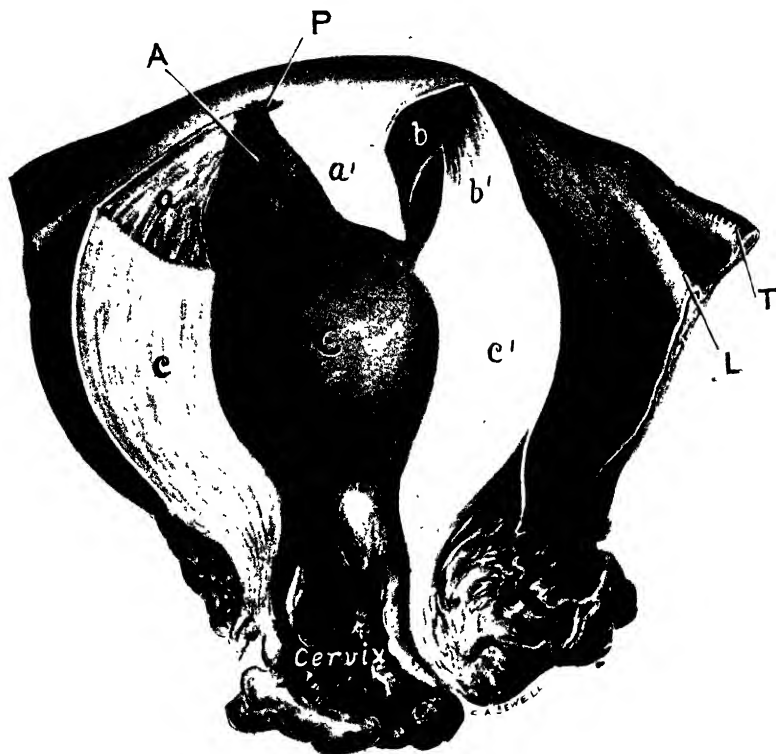


FIG. 92.—Uterus removed in a case of cancer of the vagina. In this case, the sound on being introduced into the uterus perforated the fundus. On subsequent examination it was found that there was a crater-like excavation at the right cornu of the uterus. It extended completely through the muscle, and its roof was formed by peritoneum alone. The patient had been confined six weeks previously. There was no cancer in the uterus. A. Excavation at fundus. P. Site of perforation. C. Uterine cavity. T. Tube L. Round ligament. The remaining letters indicate surfaces which were in contact before the wall was incised.

curette, which it is intended to use on the fundus, is then introduced, and for this purpose the author recommends either Martin's or Sims' curette. If the latter is used, the handle must be so bent that the cutting edge is the highest point, as otherwise this edge would not come into contact with the fundus. The fundus is curetted by a lateral movement of the curette from left (the patient's) to right. The knowledge of the exact degree of force, with which it is desirable to make the

curette press against the mucous membrane, can only be obtained by experience. Speaking generally, the degree of force which will just cause the uterine muscle fibre to impart a sensation to the hand as if the curette was travelling over a rough surface is the correct degree to use.

As soon as the entire surface of the uterus has been well scraped, the fragments of mucous membrane are washed away with a Boze-mann's catheter. A caustic solution may be then injected by means of a Braun's syringe (*v. Fig. 79*). For this purpose we are in the habit of using a 50 per cent. solution of formalin. This is allowed to remain in the uterus for from fifteen to sixty seconds, according to the effect we desire to produce, and is then washed away. It is a powerful antiseptic as well as a caustic, and it also causes contraction of the muscle fibre of the uterus, so tending to check bleeding. Chloride of zinc in a 50 per cent. solution and iodised phenol (iodine one part and carbolic acid three parts) are also used by some operators as a substitute for formalin.

Complications.—With the exception of sepsis, there is no very important complication which can occur except the perforation of the uterus by the sound or the curette. The latter accident owes its accompanying risk to the possibility of its permitting or causing the introduction of septic germs into the peritoneal cavity, and to the fact that, if its occurrence is not noticed, the operator may inject a quantity of a poisonous antiseptic into the peritoneal cavity, rather than to any special danger due to the breach of surface of the uterus. Perforation of the uterus, in the course of an aseptic operation, is, if recognised, of the most trifling importance. Perforation of the uterus, when either its interior or the perforating instrument is septic, will very frequently lead to fatal results.

After-treatment.—The uterine plugging should be removed on the morning or evening of the day following the operation. The patient ought to remain in bed until all hæmorrhagic discharge has ceased. It is sometimes advisable to inject into the uterus a caustic solution such as formalin, or to carry the solution in by means of a Bandl's sound, once or twice during the month succeeding the curetting. This is especially necessary in the presence of a chronic enlargement of the uterus, as it hastens involution and encourages the growth of a healthy endometrium.

AMPUTATION OF THE CERVIX.

Amputation of the cervix may be performed either above or below the cervico-vaginal junction. Accordingly, two operations must be described:—

- I. Supra-vaginal amputation of the cervix.
- II. Vaginal amputation of the cervix.

I. SUPRA-VAGINAL AMPUTATION.—Supra-vaginal amputation of the cervix is the term applied to the removal of the cervix above the cervico-vaginal junction.

Indication.—The only indication is hypertrophy of the supra-vaginal portion of the cervix, and, as this indication is usually associated with prolapse of the uterus, supra-vaginal amputation usually forms part of an operation for prolapse. The treatment of malignant disease of the cervix by supra-vaginal amputation has now been completely given up in favour of hysterectomy.

Instruments.—The following instruments are required:—Three American forceps; a posterior speculum; small and medium whole-curved needles; a needle-holder; a scalpel; scissors; an uterine sound; a metal catheter; a toothed dissecting forceps; and half a dozen clip forceps.

Operation.—A posterior speculum is passed, the cervix is seized and drawn down by means of two American forceps, one on each lip, and the relation of the bladder to it is noted by passing a catheter. An incision is then made round the cervix through the vaginal mucous membrane, taking care to keep below the point to which the bladder extends, and, with the finger, the mucous membrane is pushed upwards off the cervix, beginning anteriorly and continuing right round (*v. Fig. 93*). When as much of the cervix as it is desired to remove has been exposed, a circular amputation is performed by cutting it straight across at right angles to the cervical canal. The stump is then caught with forceps, a pair being applied to each lip. The vaginal flaps are drawn over the cervix to see how they fit, and any redundancy is cut away. As a rule it will be found advantageous to divide the sleeve of vagina into four flaps, by cutting V-shaped pieces out of it (*v. Fig. 94*), as by so doing the vaginal mucous membrane will cover the cervix more exactly. Two silk-worm-gut sutures are then passed, one through each of the anterior flaps of vaginal mucous membrane, entering half an inch from the edge of mucous membrane, and then passing through the stump of the anterior lip of the cervix from before backwards to emerge through the cervical canal (*v. Fig. 94*). Two more sutures are passed in a similar manner through the posterior flaps of mucous membrane, half an inch from the edge, and through the stump of the posterior lip, to emerge again through the cervical mucous membrane. These sutures may now be tied, taking care while doing so to draw the vaginal mucous membrane over the stump into contact with the cervical mucous membrane, in which position it may be kept by a few superficial catgut sutures (*v. Fig. 95*).

Complications.—The chief accident that may happen is the wounding of the bladder. This is avoided by carefully noting its position at the beginning of the operation, and by pushing it well up out of the way



FIG. 93.—Supra-vaginal amputation of a hypertrophied and lacerated cervix. The cervix, C, has been drawn down, and the vaginal wall has been detached all round. A.V. Anterior vaginal wall. a. Site of amputation.

when clearing the cervix. The uterine arteries may be cut, or wounded by the needle, and the peritoneal cavity may be opened. The former of these accidents can be avoided by clearing the cervix thoroughly at the sides and so pushing the arteries upwards, while the latter is of no importance if strict asepsis has been preserved.

After-treatment.—One end of a long and narrow piece of gauze is passed through the cervical canal into the uterus, the remainder being

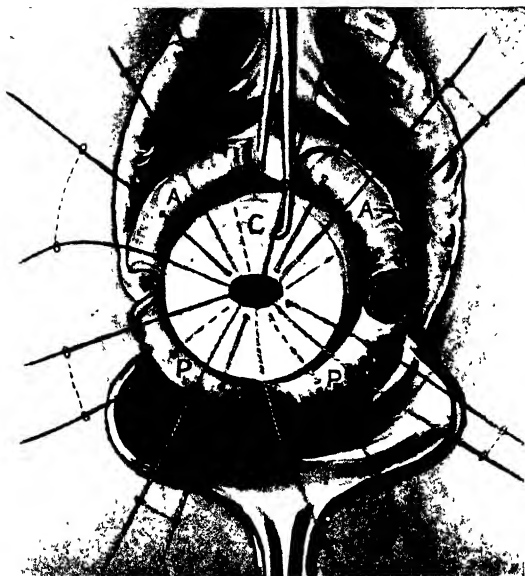


FIG. 94.—Supra-vaginal amputation of the cervix. The vaginal flaps have been trimmed, the cervix amputated, and alternate deep and superficial sutures inserted. A.A. Anterior vaginal flaps. P.P. Posterior vaginal flaps. C Stump of cervix.



FIG. 95.—Supra-vaginal amputation of the cervix. The sutures tied.

used to tampon the vagina. This gauze is removed on the evening of the second day. The patient is allowed to sit up on the tenth day, and the sutures are removed on the twenty-first day.

II. VAGINAL AMPUTATION OF THE CERVIX.—This operation is much more frequently required than is supra-vaginal amputation.

Indications.—Vaginal amputation is indicated under the following pathological conditions of the cervix :—

- (1) A large erosion.
- (2) Ectropion accompanied by vaginal hypertrophy.

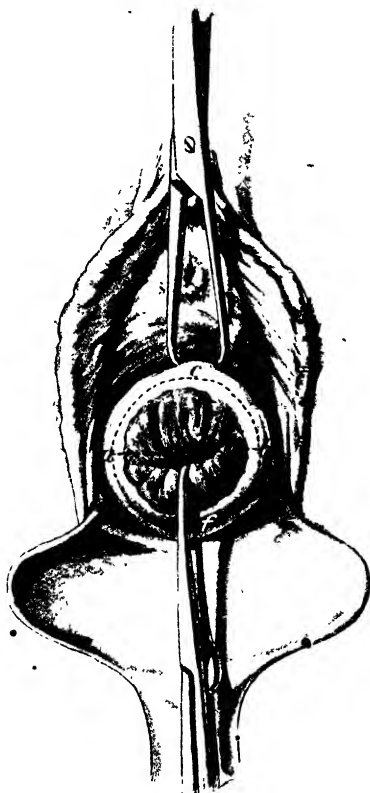


FIG. 96.—Amputation of the cervix. The cervix drawn down to the vulva and held in position by two American forceps. *a, b*. The bilateral incision. *a, c, b* and *a, f, b*. The course of the amputating incisions across the mucous membrane of the cervix.

- (3) Infra-vaginal hypertrophy.
- (4) Subinvolution affecting the entire uterus.
- (5) Stenosis of the lower portion of the cervical canal.

Instruments.—The instruments are the same as those required for supra-vaginal amputation.

Operation.—A simple form of cervical amputation is as follows :—A posterior speculum is passed, the cervix is caught by two American forceps, so placed that they catch the anterior and

posterior lip just outside the piece which is to be removed, and the cervix is drawn down towards the vulva as far as possible. The cervix is then incised transversely, so as to divide it into an anterior and posterior lip (v. Fig. 96, *a*, *b*). The anterior lip is then again caught with a third forceps in the centre of the part it is desired to remove, and this part is cut out by means of two incisions which meet one another in the depth of the cervical tissue along the

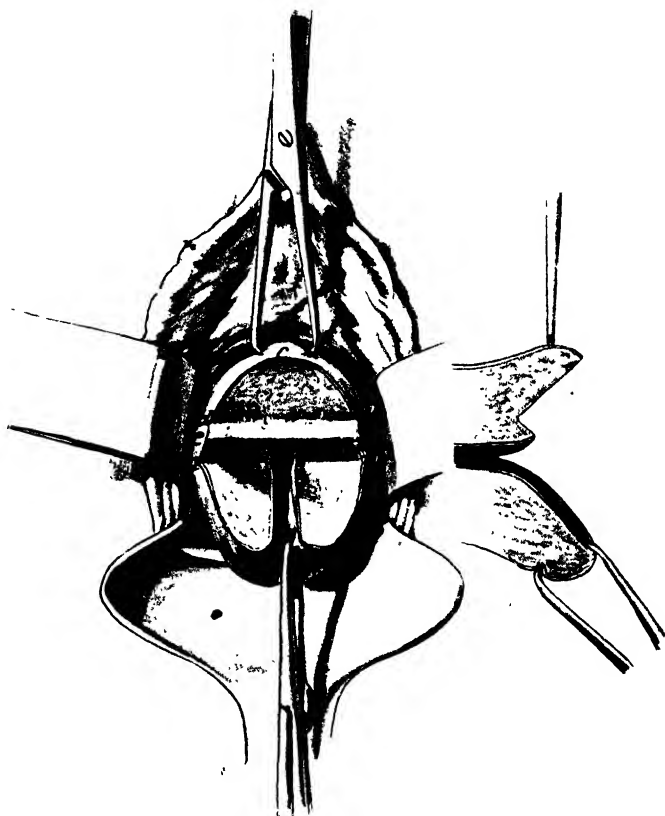


FIG. 97.—Amputation of the cervix. A wedge-shaped piece has been excised from the anterior lip. The side drawing shows the cervix in sagittal section.

line *d*, *d* (v. Fig. 97). The incision on the cut aspect of the cervix is made as high as is found necessary, while the incision on the vaginal aspect of the cervix runs just outside the edge of the erosion if one is present, and approximately corresponds with the line *a*, *c*, *d* (v. Fig. 97). Thus the entire anterior half of the erosion is removed. A suture is then entered on the vaginal aspect of the cervix in the middle line. It passes beneath the raw surface and emerges in the cervical canal (v. Fig. 98). This suture is tied. A similar piece is

next cut out of the posterior lip (*v.* Fig. 99), and a second suture is passed in the middle line through the posterior aspect of the cervical canal and the posterior flap of cervical wall (*v.* Fig. 99). These two sutures bring the mucous membrane covering the cervix into contact with the mucous membrane of the cervical canal, and are the only sutures required for this purpose. All that now remains is to pass two, or at most three, sutures at each side of the cervical canal, so as to close the original transverse incision. These sutures are passed as is

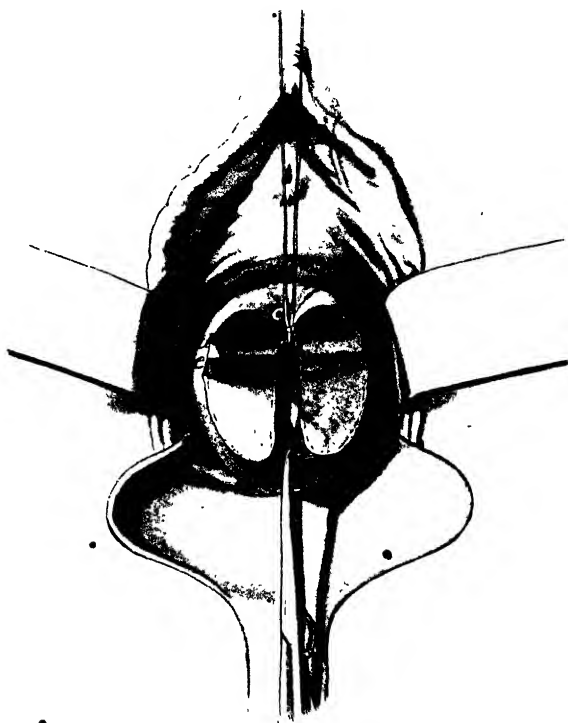


FIG. 98.—Amputation of the cervix. The central suture in position in the anterior lip.

shown in Fig. 99, and when they are tied, the cervix presents the appearance shown in Fig. 100. When the operation is performed in this manner, there is no puckering of the edges of the cervical canal and no subsequent distortion. As a rule, a couple of months after the operation, it is almost impossible to see that an amputation has been done. If necessary, the relative length of the two incisions can be altered so as to bring away a piece of any shape that is required. Thus a small portion of the vaginal aspect of the cervix and a large part of the cervical canal can be excised, or, on the other

hand, a wedge-shaped portion, including equal portions of the vaginal aspect and of the cervical canal.

After-treatment.—The after-treatment is similar to that of supra-vaginal amputation.

TRACHELORRHAPHY.

Trachelorrhaphy (τράχηλος, the cervix; ραφή, a seam) is the term applied to the operation of suturing lacerations of the cervix.

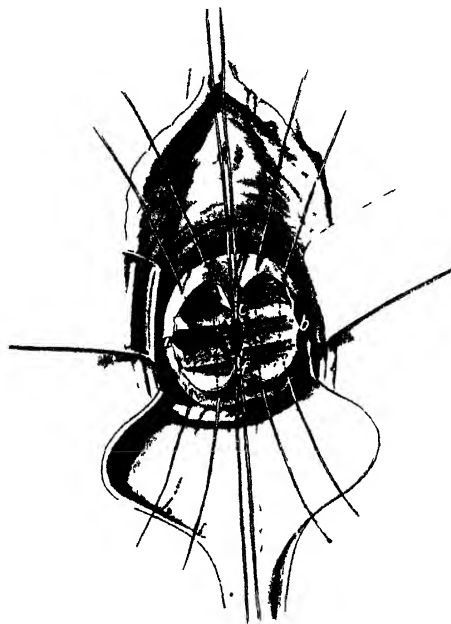


FIG. 99.—Amputation of the cervix. The central sutures have been inserted and tied in both the anterior and the posterior lips, and the lateral sutures are in position.

Indication.—Deep laceration of the cervix associated with ectropion of the cervical mucous membrane.

Instruments.—The instruments are the same as those required for supra-vaginal amputation of the cervix.

Operations.—There are two principal operations for the repair of cervical lacerations:—

(A) Säger's operation.

(B) Emmet's operation.

(A) *Säger's Operation.*—Säger's operation is applicable to lacerations which only involve one side of the cervix. The anterior and

posterior lips are seized in American forceps, and the cervix drawn towards the side opposite to that at which the laceration is situated. An incision is then made at each side of the laceration at the junction of the scar tissue and the healthy mucous membrane (*v.* Fig. 101, A), and by extending these incisions into the cervical tissue the mucous membrane lining the laceration is dissected up in one piece and drawn inwards towards the centre of the cervical canal. It is thus preserved with the object of forming a new endocervical wall for the laceration (*v.* Fig. 101, B). Special care must be taken that all the cicatricial



FIG. 100.—Amputation of the cervix. The operation finished.

tissue at the bottom of the laceration is removed. Sutures of silkworm-gut are then passed at right angles to the tear, and tied in such a manner as to bring the cut edges of cervical mucous membrane together (Fig. 101, B). The number of sutures necessary depends upon the size of the laceration, and varies between two and four. If there is a second laceration, it is treated in a similar manner.

(B) **Emmet's Operation.**—Emmet's operation is more radical, and is on that account more likely to give a permanently satisfactory result. It is equally suitable for unilateral or for bilateral lacerations. The cervical lips are seized, as before, with American forceps, and

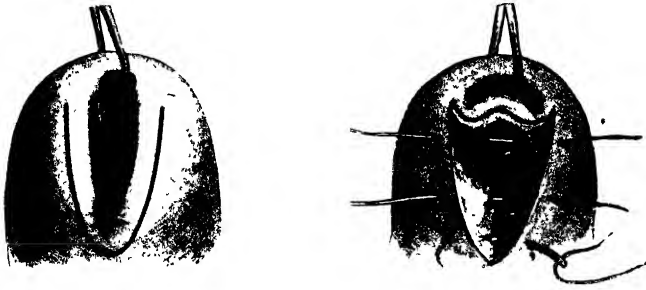


FIG. 101.—Sanger's trachelorrhaphy. The cervix is drawn forwards, the tear being in the posterior lip. A. The position of the incision round the tear. B. The flap has been turned in and sutures are in position.

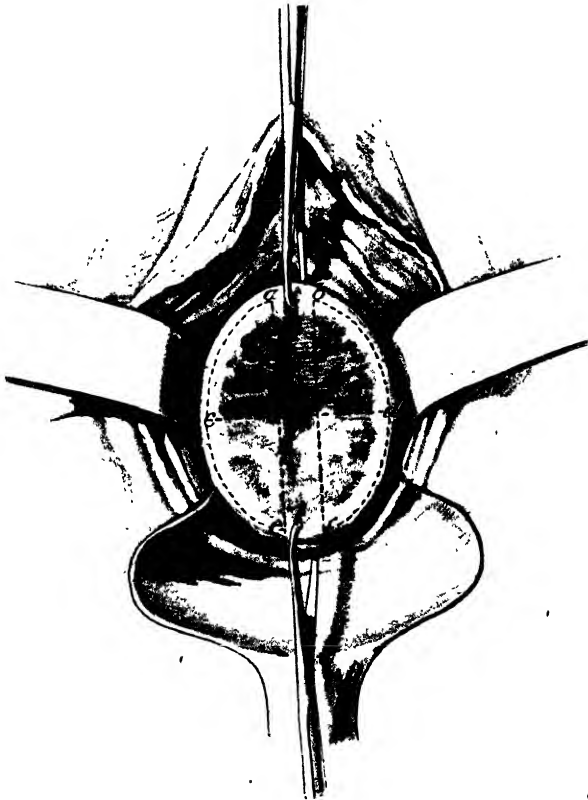


FIG. 102.—Emmet's trachelorrhaphy. The anterior and posterior lips are drawn apart. The lines of incision are marked on the inverted surfaces.

drawn apart as far as possible. With the scalpel, a transverse incision is made through the bottom of the lacerations, in order to make them both of the same depth. Two antero-posterior incisions are

then made on the exposed face of the cervix. They run parallel to what was formerly the cervical canal, and are about a quarter of an inch apart (*v.* Fig. 102). These incisions extend through the mucous membrane alone, and the tissue between them will form the new cervical canal (Figs. 102, 103). Two more incisions are then made, one at each side, connecting the ends of the former incisions, as shown. These incisions follow an imaginary line which formerly was the outer limit

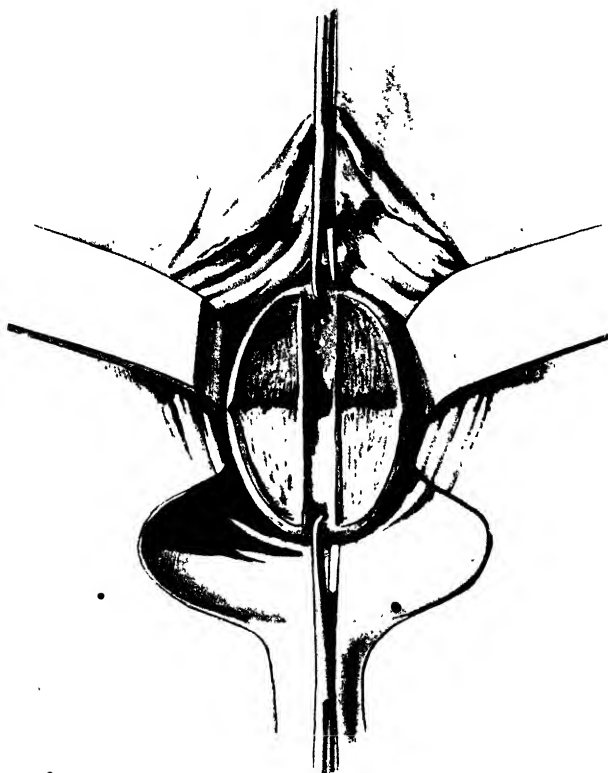


FIG. 103.—Emmet's trachelorrhaphy. The mucous membrane surrounded by the incisions has been removed.

of the cervical tear, and, consequently the two areas lying between each of them and the middle line on the same side are the areas which must be folded on themselves and brought together, in order to restore the cervix to its original shape. The next step is the denudation of these areas. This is easily done with the scalpel, and must be complete, taking particular care to excise the cicatricial tissue at the very bottom of the tear (*v.* Fig. 103). The final step is the passing of the sutures. Silkworm-gut is the most suitable material, and the manner in which each suture is passed will be easily understood by reference to the

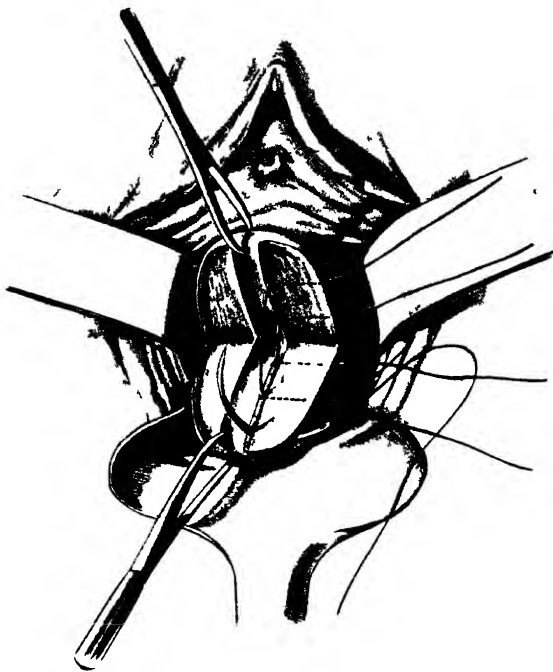


FIG. 104.—Emmet's trachelorrhaphy. The suture on the left side are in process of insertion.

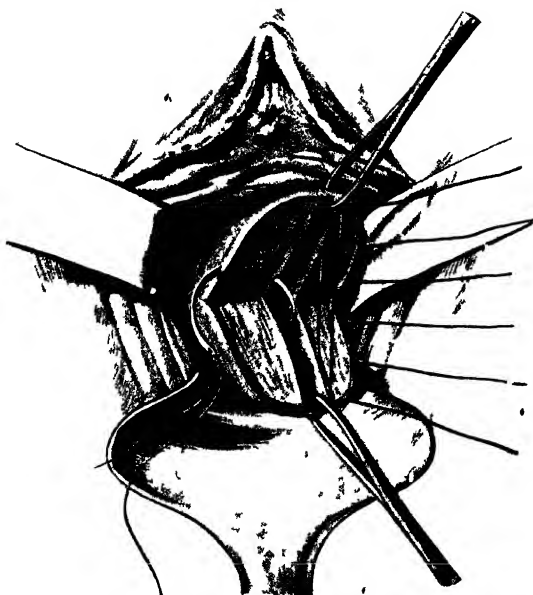


FIG. 105.—Emmet's trachelorrhaphy. The sutures on the left side are in position and on the right side are in process of insertion.

illustrations (v. Figs. 104, 105). Each suture must go down to, but must not include, the strip of mucous membrane which has been left in the centre.

After-treatment.—The after-treatment is similar to that of amputation of the cervix.

CHAPTER IX.

DISEASES OF THE UTERUS (*continued*).

New Growths of the Uterus—Myomata ; Ætiology, Pathological Anatomy, Secondary Changes, Symptoms, Diagnosis, Prognosis, Treatment—Adeno-Myoma.

BENIGN NEOPLASMS OF THE UTERUS.

THE benign neoplasms which are met with in the uterus are as follows :—

- (1) Fibro-myoma.
- (2) Adeno-myoma.

FIBRO-MYOMATA.

Fibro-myomata, or myomata ($\mu\acute{o}\varsigma$, a muscle), or uterine fibroids, as they are variously called, are the most important of the benign uterine neoplasms.

Ætiology.—Any discussion on the ætiology of myomata involves the consideration of tumour formation in general, and therefore would be out of place in a work of this kind. All that can be said is that the uterus contains the largest and densest mass of involuntary muscle in the body, and that it is the only muscle of the kind which physiologically possesses enormous powers of development and increase. Moreover, myomata as a rule usually occur in women who either have not had children, or who have passed a considerable number of years during the child-bearing period without becoming pregnant. These two facts are suggestive, and, reasoning from them, it may be held that the frequency of these tumours is due to an abnormal power of hyperplasia possessed by a uterine muscle, which has never been called on to respond to the normal hyperplasia of pregnancy.

Pathological Anatomy.—A uterine fibro-myoma is composed of both unstriated muscle cells and fibrous tissue. In some tumours the fibrous tissue predominates, in others the muscular. In small and young tumours the muscle-tissue is greatly in excess ; the fibrous tissue increases with the age of the tumour. Myomata are more or less circular in form, on section present a whorled appearance, and vary from a microscopic size to that of a nine months' pregnancy.

They are usually multiple, and they tend to grow in one of the following ways (v. Fig. 106) :—

- (1) Outwards into the uterine cavity,—submucous myoma.
- (2) Inwards into the abdominal cavity,—subserous or subperitoneal myoma.
- (3) Between the layers of the uterine wall, so that there are coverings

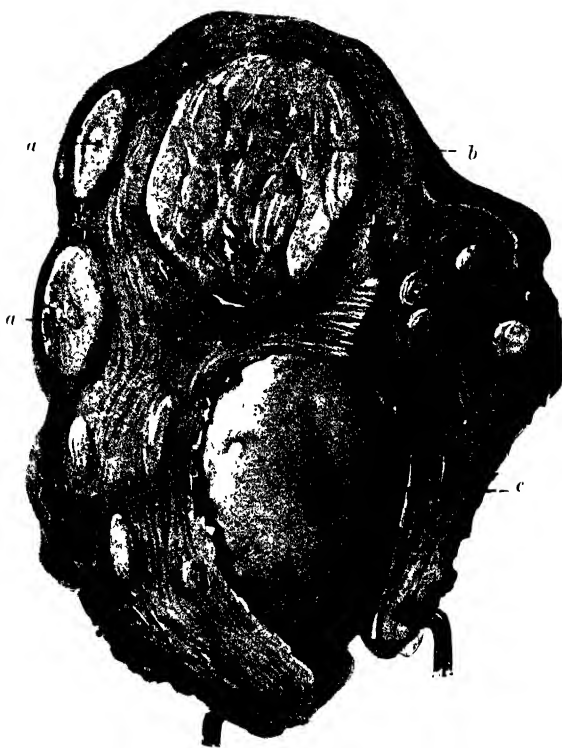


FIG. 106.—A myomatous uterus, illustrating the various positions in which a myoma may grow. *a*, Subperitoneal myoma. *b*, Interstitial myoma. *c*, Pedunculated submucous myoma.

of normal uterine tissue between the myoma and both surfaces,—interstitial myoma.

An interstitial myoma may grow outwards or inwards so as to become either submucous or subperitoneal, and a submucous or subperitoneal myoma may become pedunculated.

Secondary Changes.—The following changes may take place in myomata.

(1) Necrosis.—Necrosis, or death, of the tumour occurs in consequence of a total deprivation of the blood supply to a part or the whole of it. Such a change is most likely to occur in pedunculated tumours

owing to obstruction of the vessels in the pedicle by twisting or other form of compression. It may also occur in a sessile myoma as a result of long-continued compression. The necrotic change usually occurs in



FIG. 107.—Section through an interstitial myoma, springing from the fundus, showing the whorl-like blending of muscle and fibrous tissue. 1. Main mass of the myoma. 2. Capsule formed by thinned-out uterine wall and peritoneum, and containing dilated veins. 3. Cavity of uterus. 4. Cervix. 5, 5. Enlarged and oedematous ovaries. 6. Fallopian tube. (*Roberts.*)

the central portion of sessile tumours (*v.* Fig. 109) and in the periphery of polypoid tumours where they are most subjected to pressure. "If putrefactive bacteria gain access to such necrosed tumours, sloughing occurs.

(2) Fatty degeneration.—This change occurs, in all probability, as a result of a diminution in the blood supply of the tumour, and results in the marked lessening and sometimes, it is said, though this is unlikely,

in the entire disappearance of the tumour. It most frequently occurs after parturition, and, if the uterine cavity is infected, there is considerable danger of sloughing of the myoma in consequence of the diminished blood supply.

(3) Mucoid degeneration. — So-called mucoid degeneration and œdema of the tumour are very closely associated. Interference with the lymph return leads to a serous infiltration or chronic œdema of



FIG. 108.—A uterus with multiple myomata.

the tissues, and this results later in a simple degeneration of a mucoid nature. In a typical case, first the whole tumour becomes water-logged; and, later, cavities form and enlarge into cysts (*v.* Fig. 110). The fluid consists of serum-albumin and fibrin, with more or less mucin, blood, and detritus from degenerated tissue.—

(4) Cystic degeneration of lymphatic origin.—Occasionally the lymph vessels of a myoma may dilate, without any transudation taking place into the surrounding tissues, with the result that cavities form, lined with endothelium and filled with lymph.

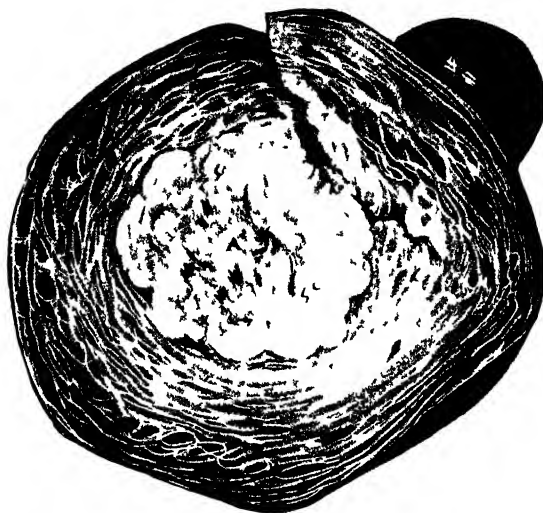


FIG 109.—Fibro-myoma of the uterus, showing necrosis in the centre (marked A)



FIG 110.—Fibro-myoma of the uterus, showing mucoid degeneration. At A the tissue has become friable, with irregular cavities. At B is a large cavity. (From a specimen removed by Dr. P. McArdle)

(5) Calcareous degeneration.—This change consists in the deposit of lime salts in the tumour. Usually, these salts are first deposited in the centre and travel outwards concentrically; more rarely, the salts are deposited at first in the capsule. Calcification only occurs in a tumour,

or part of a tumour which has ceased to grow. If the myoma which is so affected is pedunculated, it may become detached and set free, in the abdominal cavity if it is a subserous myoma, or in the uterine

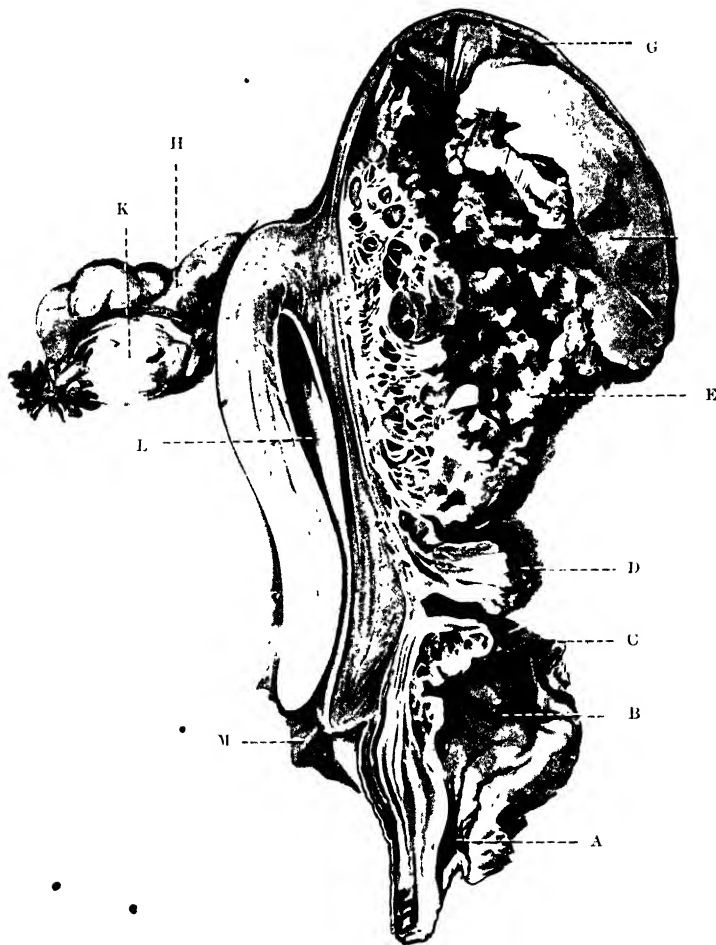


FIG. 111.—Calcareous degeneration of a subperitoneal myoma. A. Urethra. B. Bladder. C. Edge of gap, result of ulceration in bladder wall. D. Edge of gap in capsule of myoma, also the result of ulceration. E. Calcified masses in centre of myoma. F. Non-calcified remains of myoma. G. Capsule. H. Fallopian tube. K. Ovary. L. Uterine cavity. M. Vagina. (From a specimen in the School of Physic, Trinity College, Dublin.)

cavity if it is a submucous myoma. If the entire capsule is calcified, the blood supply of the tumour is shut off, and the tissue becomes necrotic.

(6) Angiomatous degeneration.—In some cases the blood vessels of the myoma undergo a marked increase in number and size, so that the

structure of the tumour resembles that of a sponge. These tumours are known as *cavernous* or *telangeiectatic myomata*.

(7) Red degeneration.—This change consists in a necrosis of the tissue of the tumour accompanied by a diffuse red staining. The degree of staining varies considerably, in some cases being merely a pink coloration, in others being so marked as to make a section of the



FIG. 112.—Fibro-myoma of the uterus, undergoing red degeneration. A, Fibrous tissue with a few muscle fibres. B, Fibrous tissue degenerate. C, Dilated vessel

tumour resemble raw beet-steak (v. Fig. 112). The change is most commonly associated with pregnancy, and is probably due to the sudden cutting off by pressure of a rich blood supply; the contained blood becomes laked, and the hæmoglobin thereupon stains the tissues. Red degeneration is not a very common phenomenon, though its minor degrees are liable to be overlooked.

(8) Malignant degeneration.—Sarcomatous degeneration is not of very uncommon occurrence, and is a possibility which must be

remembered when discussing the advisability of operative interference (v. Fig. 113). It is a change which takes place very insidiously, and, when it is diagnosed, it is usually too late to remove the tumour completely. Carcinomatous degeneration is very much more rare than sarcomatous, inasmuch as it is probably only in a small proportion of cases that the pre-existing epithelium, which is necessary for the



FIG. 113.—A sarcoma occurring in pre-existing fibro-myoma of uterus. A, Sarcoma tissue replacing fibro-muscular tissue. B, Sarcoma tissue infiltrating fibro-muscular tissue. C, Fibro-muscular tissue.

development of the carcinoma, is found in a myoma. In these cases, the starting point of carcinoma is probably the same as the starting point of adeno-myoma of the uterus, viz., the remains of a Wolffian body, or portions of included uterine glands. Secondary involvement of a myoma, by carcinoma starting in the endometrium, is an occasional occurrence. A typical example of the manner in which such a condition begins is shown in the accompanying drawing (v. Fig. 114).

Symptoms.—The symptoms caused by myomata are a varying degree

of menorrhagia, metrorrhagia, leucorrhœa, dysmenorrhœa, and pain. Symptoms produced by the pressure of the tumour on the pelvic and abdominal viscera are also usually present.

It will be easily understood that the extent to which these symptoms occur varies greatly in different cases. Speaking generally, they may be said to depend upon the following points:—

- (1) The situation of the tumour, *i.e.*, whether it is subperitoneal, interstitial, or submucous.

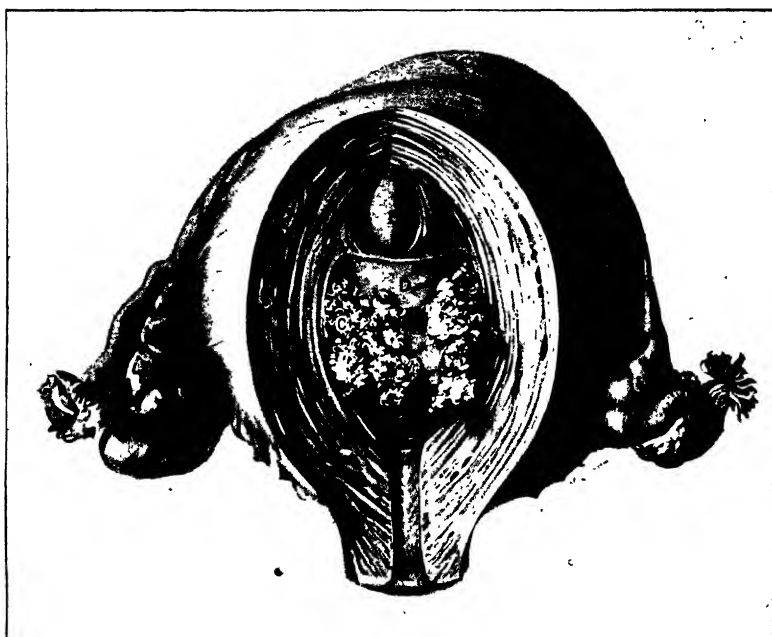


FIG. 114.—Fibro-myoma of the uterus, associated with adeno-carcinoma of the endometrium. A. Large subperitoneal myoma, on posterior wall of uterus. B. Interstitial myoma. C. Papillomatous malignant outgrowths springing from C, posterior wall of uterine cavity. (From a specimen removed by the author.)

- (2) The condition of the endometrium.
- (3) The size of the tumour and the situation of the enlarged uterus.
- (4) The age of the patient.
- (5) The changes which the tumour is undergoing.

(1) *The Situation of the Tumour.*—The situation of the tumour affects to a marked extent the degree of menorrhagia and metrorrhagia, leucorrhœa and dysmenorrhœa—that is, the various symptoms of endometritis—as these symptoms to a large extent depend on the proximity of the myoma to the endometrium. These symptoms are most marked in submucous myomata,

and are least marked or absent in pedunculated subperitoneal myomata.

(2) *The Condition of the Endometrium.*—The condition of the endometrium has naturally a marked effect on the amount of hæmorrhage (v. Fig. 115). Endometritis is usually present in cases of myoma, and, according to its degree, the hæmorrhage is profuse and constant or slight and occasional.

(3) *The Size of the Tumour and the Situation of the Enlarged Uterus.*—The size of the tumour also affects the amount of hæmorrhage, unless the entire growth is subperitoneal. In all cases, a myoma causes pres-



FIG. 115.—Uterus, with multiple fibro-myomata, most of which are submucous. There was marked endometritis also present.

sure symptoms in proportion to its size and situation, and, if it should become impacted in the pelvis, these symptoms will be very acute, and in neglected cases will exactly resemble those caused by an incarcerated retroverted uterus. In such cases a fatal termination may occur from retention and decomposition of urine, over-distension of the bladder, and sloughing of the bladder wall. If the tumour reaches an extreme size, intestinal atony may result from pressure on the intestines, and cardiac distress and dyspnœa may result from pressure upon the heart.

(4) *The Age of the Patient.*—The symptoms of a myoma, in so far as they are dependent on the blood supply of the tumour, tend to diminish at the onset of the menopause, because the uterine blood supply begins to lessen. In some cases, the diminution may be so great that the

patient returns to comparative health, whilst in others the change is scarcely noticeable. Too much importance has in the past been attached to the possibility of this improvement occurring, and many women have been allowed to remain invalids for years in the hope that the onset of the menopause would bring relief. Now, however, it is becoming very widely recognised that in the majority of cases such a hope is illusory, and that only in cases of very small myomata can any improvement be expected. All the symptoms become worse at the onset of and during a menstrual period.

(5) *The Changes which the Tumour is undergoing.*—The changes which the tumour undergoes have sometimes a marked effect upon the nature and amount of the uterine discharges. Thus, if calcification occurs, hæmorrhage and leucorrhœa are lessened. In fatty degeneration, hæmorrhage is also lessened, and though at first there is an increase in the leucorrhœa, after a time this discharge will also be diminished. In malignant degeneration, the discharge is at first profuse, and at intervals there may be severe hæmorrhages. As soon as the malignant growth becomes infected by saprophytic or septic bacteria, the discharge becomes sanious. If sloughing occurs, there is also a sanious discharge, and, if there is suppuration, pus escapes.

Diagnosis.—The diagnosis of a myoma may be a very simple procedure, or, on the other hand, it may be a matter of the greatest difficulty; or it may even be impossible without the aid of an exploratory laparotomy. The main points on which we depend in making a diagnosis are as follows:—

(1) The existence of a tumour, usually multinodular, incorporated in or connected with the uterus.

(2) The palpation of both ovaries as bodies separate from the tumour.

(3) The elimination of the possibility of pregnancy as a cause of the uterine enlargement.

(4) In the case of submucous myomata, the projection of a tumour into the interior of the uterus, as determined by the sound or by digital exploration of the uterine cavity.

(5) The history of the gradual growth of a tumour upwards from the pelvis, accompanied by menstrual disturbances as described above.

In a typical case, on making a bimanual examination, a multinodular tumour will be found, in which the uterus is incorporated, and which moves when the cervix is pulled upon. The ovaries are felt lying alongside the tumour, and possibly their connection with it may be determined. The tumour may be freely movable, or on the other hand it may be firmly fixed as a result of its impaction in the pelvis. In the case of a submucous or interstitial myoma, the uterus may pre-

serve its shape, while at the same time it is enlarged to a varying extent. Such cases are readily confused with pregnancy, or, if the enlargement is but slight, with chronic corporeal myo-metritis. The diagnosis from pregnancy is made principally by the history of the patient, and by the character of the enlargement. In pregnancy, the uterus is softer, especially the lower uterine segment; the body is more globular; it may be possible to obtain internal ballotement; and, when the sixth month is passed, it is possible to obtain the certain signs of pregnancy, *i.e.*, to auscultate the foetal heart and to palpate the foetal parts.

The diagnosis of a small submucous myoma is sometimes very difficult. The tumour may not cause any noticeable increase in size in the uterus, and its presence may only be suspected from the symptoms of the patient. When the tumour projects from the inner surface of the uterus, it can usually be felt with the sound. If it cannot, then it may be necessary to introduce the finger into the uterine cavity after full dilatation of the cervical canal with sea-tangle tents. If even the finger cannot detect its presence, and the hæmorrhage continues in spite of curetting, and if there is still reason to think that a myoma may be present, the uterine wall may have to be incised and the cavity thoroughly explored.

A myomatous uterus must also be distinguished from ovarian tumours, enlargement of the Fallopian tubes, extra-uterine pregnancy, a large retro-uterine hæmatocele, splenic and renal tumours, and malignant growths which have extended into the pelvis from any abdominal organ. A myoma, such as that shown in the accompanying drawing (*v.* Fig. 116), can be readily mistaken for an ovarian tumour, cystic tubes, or a hæmatocele in Douglas' pouch, or for the body of an enlarged retroverted uterus.

Prognosis.—The prognosis, and hence the treatment of myomata, depend upon conditions very similar to those which influence the symptoms, *i.e.*, the situation and size of the tumour, the changes which may take place or are taking place in it, and the age of the patient. Myomata may cause death by the continued loss of blood; by the debilitating effect of profuse leucorrhœal discharge; by the pressure they exert upon vital organs; or by forming the starting point of malignant growths. On the other hand, subperitoneal, and sometimes interstitial, myomata of quite small size, which do not cause any symptoms, and do not increase in size, may as a general rule be considered to be harmless. If, however, an opportunity occurs for their removal, they ought to be removed.

Treatment.—The treatment of myomata is somewhat complex, as so much depends upon the nature and circumstances of each individual case. The various measures which are adopted will be best considered under two heads:—

- I. Palliative treatment—that is, the adoption of measures directed towards the relief of the symptoms and the checking of the growth of the tumour.
- II. Radical treatment—that is, the removal of the myoma either with, or without, the removal of the uterus.

I. PALLIATIVE TREATMENT.—Palliative measures consist in the adoption of one or more of the following lines of treatment:—

(A) The free use of such drugs as Ergot, Hydrastis Canadensis, and Cannabis Indica. Any good preparation of Liquid Extract of Ergot

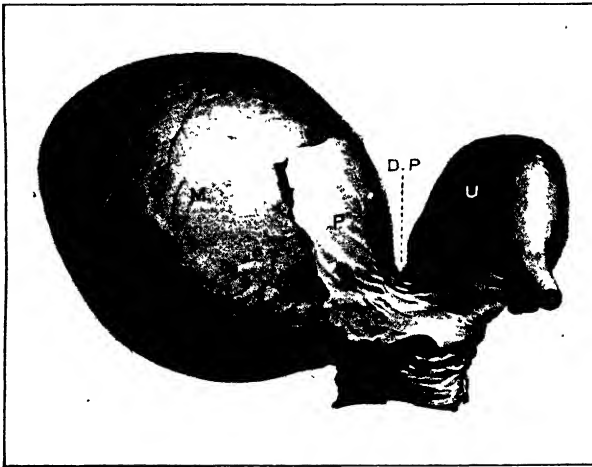


FIG. 116.—A subperitoneal myoma springing from the posterior cervical wall, and lying behind the peritoneum, which forms the posterior wall of Douglas' pouch. U. Uterus. D.P. Douglas' pouch. P. Peritoneum. M. Myoma springing from cervix. (From a specimen in the possession of Dr. Earl.)

may be used instead, the dose consisting of from twenty to thirty minims at each injection. Ergot will probably tend to limit the blood supply of the uterus, and so to check the hæmorrhage and the growth of the tumour in some cases, but it is most uncertain and unsatisfactory in its action. The Liquid Extract of *Hydrastis Canadensis* is administered by the mouth in doses of from ten to fifteen minims three times a day, and the Tincture of *Cannabis Indica* in doses of from five to fifteen minims.

(B) The use of X-rays, a line of treatment which has received a considerable amount of attention of late.

(C) Curetting. The effect of curetting is to remove the diseased endometrium which commonly is present in association with myomata, and in this way, in some cases, it brings about a temporary relief of the symptoms. This relief will be of longer or shorter duration

according as the myoma is subserous or close to the endometrium. In the latter case, the benefit is extremely transitory. Curetting is often of value as a preliminary to a more radical operation, by removing an endometrium which may be in a septic condition.

II. RADICAL TREATMENT.—Operations for the removal of myomata fall under two heads :—

(1) Those involving the removal of both the uterus and the myoma.

(2) Those involving the removal of the myoma alone.

(1) Hysterectomy is the operation most frequently performed in the case of large myomata. The form of hysterectomy which is chosen in any particular case depends upon the size and position of the tumour. Partial or supravaginal hysterectomy is the operation of choice. Total ventral hysterectomy is only indicated in the presence of infection, or of associated malignant disease, or if the position of the tumour prevents the isolation of the cervix. Vaginal hysterectomy, without any preliminary reduction in size of the uterus, is rarely possible in the case of a myomatous uterus, owing to want of room.

(2) The removal of the myoma alone is known as myomectomy, a term which includes the excision of a pedunculated myoma by cutting across the pedicle, and the shelling out of a sessile or interstitial myoma. Myomectomy can be carried out by the abdominal or the vaginal route. The abdominal route is the more suitable in the case of a pedunculated subperitoneal myoma, or of a non-pedunculated subperitoneal or interstitial myoma. In the former case, the pedicle if thin can be simply tied and cut; if thick, it can be cut across by a wedge-shaped incision, and its edges brought together by sutures. In the latter case, the capsule of the myoma is incised, and the tumour is shelled out of its bed, the resultant cavity being closed by continuous sutures, or by mattress sutures, according to its size. Vaginal myomectomy, on the other hand, is always indicated when pedunculated or sessile submucous myomata protrude into the uterine cavity, and also sometimes in the case of such small subperitoneal myomata as can be easily reached from the vagina through the anterior or posterior fornix.

Pedunculated submucous myomata, or “fibrous polypi,” which have been expelled from the uterine cavity, are very easily removed by this method. In their case, it is only necessary to seize the polypus with a strong forceps and to twist it gradually away if the pedicle is thin, or, if the latter is very thick, to divide it with scissors after first tying it, if it is accessible. If there is any difficulty in checking the hæmorrhage, the uterus must be firmly plugged with gauze.

Sessile submucous myomata, or polypi which have not been expelled

from the uterus, can be removed in one of two ways. Either the cervix may be dilated by means of sea-tangle tents and Hegar's dilators and the tumour then removed, if a polypus, by twisting it away, and if a sessile tumour, by gradually cutting it away with a Schultze's spoon forceps, or the anterior wall of the uterus may be incised after first separating the bladder as in a vaginal coeliotomy, the tumour enucleated, and the incision sutured. If the tumour is of large size, it may be necessary to remove it piecemeal—so-called morcellation.

As we have now mentioned the different methods of treating myomata of the uterus, we must go on to discuss briefly the rules which ought to guide us in deciding upon the proper course to adopt in any given case. First, we must decide between palliative and radical treatment. Every myoma which causes sufficient symptoms to bring a patient to seek medical aid should be removed; the earlier the operation is performed the easier it will be, and the greater will be the possibility of saving the uterus. Difficult and dangerous operations are the result of expectant treatment. In the case of a married woman, the chances of childbirth are increased by early operation. It may be taken as a general rule that, if a woman within the child-bearing period has a myoma which would not prevent pregnancy, it can be removed by myomectomy, and that, if hysterectomy is necessary, a successful pregnancy would have been impossible, owing to the number or the positions of the tumours.

Secondly, we must decide what form of radical treatment is to be adopted. There is one general principle which applies whenever the patient has not reached the menopause, and this is never to remove more than is necessary. The only exception to this rule is when the patient is so weak from previous hæmorrhage or other debilitating conditions that the length of the operation is of supreme importance. Under these conditions, we select whatever form of operative procedure is the shortest. Otherwise, if the tumour can be removed alone and the uterus left, we should only remove the tumour. If it is necessary to remove the uterus also, and the ovaries are healthy, the latter must always be left. Only when the ovaries are diseased, or when the situation of the tumour makes it impossible to leave them behind, should both ovaries and uterus be removed. Accordingly, in all cases in which myomectomy is possible, it should be performed. If the tumour is small, and is projecting into the uterine cavity, it should be removed by the vaginal route; if it is projecting through the cervix into the vagina, it should also be removed by this route, whether large or small; in all other cases, the abdominal route is preferable. If myomectomy cannot be performed, then hysterectomy becomes necessary.

In what cases is it impossible to perform myomectomy? Theoretically speaking, myomectomy is possible in every case. Practically, however, one has to consider the length of the operation, and the condition in which the uterus is left. There are three types of case in which the operation is clearly contra-indicated:—First, where the number of myomata is excessive, and the tumours invade the uterine wall in all directions; secondly, where they are in such intimate relation to the peritoneum as to make it impossible to get proper covering for the cavities left in the uterine wall; thirdly, where the tumours are situated in positions in which it would be very difficult to



FIG. 117.—Adeno-myoma of the uterus seen under a high power.

control the bleeding after their removal. Thus the most suitable type of case for myomectomy is where a large and single interstitial myoma grows near the fundus, the most unsuitable type where a number of myomata grow in relation to the lower uterine segment and the uterine arteries. In the selection of cases much depends on the experience of the operator.

ADENO-MYOMA.

Adeno-myoma is the term applied to a fibro-myoma in which epithelial glandular structures are embedded. These structures are found not in the capsule of the tumour, but in the actual new growth itself.

Pathology.—Most of these tumours begin as a diffuse myomatous thickening of the uterine muscle. This thickened tissue contains chinks or crevices into which the normal mucous membrane grows, thus carrying into it glandular elements. Later, pieces of this tissue become nipped off, and are carried either towards the outer or inner surface of the uterus, in which case we find either subperitoneal or intra-ligamentary adenomyomata or submucous adeno-myomata. A diffuse adeno-myoma presents a very coarse appearance, owing to the muscle bundles which run in all directions. The spaces between the bundles are filled with translucent tissue, which represents the areas of glandular elements. When these elements are the result of inclusion of uterine mucosa, occasionally a direct connection with the mucosa can be traced. Sometimes the glandular areas become cystic, and are filled either with mucus secreted by the glands, or with blood. Such tumours are known as cystic adeno-myomata, and occasionally the cyst may reach a very considerable size.

Symptoms.—The symptoms of these tumours are in the main very similar to those of the ordinary type of myoma.

Treatment.—The treatment is similar to that of the ordinary type of myoma, namely myomectomy if the tumour can be definitely removed, otherwise supra-vaginal hysterectomy. In cases of diffuse adeno-myoma hysterectomy is always indicated.

CHAPTER X.

DISEASES OF THE UTERUS (*continued*).

Malignant Neoplasms : Carcinoma of the Body ; Carcinoma of the Cervix ; Sarcoma ; Endothelioma ; Chorion-Epithelioma. Operation :—Curetting and Cauterisation of Inoperable Malignant Disease.

MALIGNANT NEOPLASMS OF THE UTERUS.

THE malignant neoplasms, which are met with in the uterus, are as follows :—

- I. Carcinoma.
- II. Sarcoma.
- III. Endothelioma.
- IV. Chorion-epithelioma.

CARCINOMA OF THE UTERUS.

Cylindrical-celled cancer or adeno-carcinoma may start in the uterine or in the cervical glands. Squamous-celled cancer can only arise outside the os externum, that is in that portion of the cervix which is covered with compound squamous epithelium. We shall discuss cancer of the body and of the cervix separately.

CARCINOMA OF THE BODY.—Cancer of the body is always cylindrical-celled, save in the exceptional cases in which it is secondary to a pre-existing growth in the cervix. It is a comparatively rare disease, and occurs usually in women between the ages of fifty and sixty, and more frequently in nulliparous than in parous women. It is not infrequently associated with myomata of the uterus.

Pathological Anatomy.—The growth starts from the cylindrical epithelium of the uterine glands, and is in fact an adeno-carcinoma. It then continues to develop in one of two ways :—as a circumscribed growth, or as a diffuse growth. The circumscribed form is the rarer of the two. In it, a tumour—sessile or slightly pedunculated—is found springing from some portion of the uterine wall, while the remainder of the mucous membrane is quite unaffected (*v.* Fig. 118). In the diffuse form the disease involves all, or the greater part of, the endometrium, and then spreads outwards into the muscular coat (*v.* Fig. 119). As the growth of the disease continues, the entire body of the uterus becomes

affected, but extension rarely, if ever, takes place into the cervix. Extension takes place into the broad ligaments, and subperitoneally all round the uterus; and, finally, any of the neighbouring organs may be involved, and metastases may occur in the liver and lungs.

Symptoms.—The earliest symptom of cancer of the body of the uterus is the occurrence of a watery and blood-stained discharge, which very quickly becomes sanious, owing to the infection of necrotic tissue by saprophytic organisms. At the same time, or later, there is constant pain resembling that caused by metritis. As the growth spreads, the discharge increases, and there may be profuse attacks of hæmorrhage owing to ulceration of the walls of vessels. The pain also increases as the trunks of the sacral nerves become involved. If there is much



FIG. 118.—Adeno-carcinoma of the body of the uterus (mesial section).

sloughing, the patient may have the symptoms of septic absorption, and the infection may travel to the peritoneal cavity and cause a general peritonitis. In the last stages, the ureters may be compressed, causing suppression of urine and consequent uræmic poisoning.

Diagnosis.—Cancer of the body of the uterus in its early stages may be suspected from the foregoing symptoms, especially if they are associated with a more or less uniform enlargement of the uterus. Its existence can be confirmed by the removal, and subsequent microscopical examination, of a fragment of the endometrium. Cancer of the body may be very closely simulated, so far as the symptoms and physical signs are concerned, by a sloughing submucous myoma, and also by some of the forms of endometritis and particularly by senile endometritis. Moreover, it is by no means uncommon for malignant disease of the endometrium to be associated with myomata, and in such cases the microscope affords the only means of diagnosis. The only condition which may be confused with malignant disease, even if

a careful microscopical examination is made, is glandular endometritis, owing to the hyperplasia of the glands.



FIG. 119.—Diffuse carcinoma of the uterus. A, Secondary deposit in ovary. B, Infiltration along the course of the infundibulo-pelvic ligament.

It must be most carefully remembered that, if a permanent cure is to be obtained by operation in these cases, early diagnosis is essential,

and for this a portion of the endometrium must be removed for microscopical examination in every case in which persistent and irregular hæmorrhages occur in an elderly woman. The same course must also be adopted in the case of young women where recurrent hæmorrhages do not cease after the ordinary treatment of these cases—curetting, etc.—has been tried.

Prognosis.—If the uterus is removed before the neighbouring tissues or glands are implicated, the prognosis is good. However, unfortunately, the patient is not always seen at such an early stage. In inoperable cases, or in cases in which after operation the growth

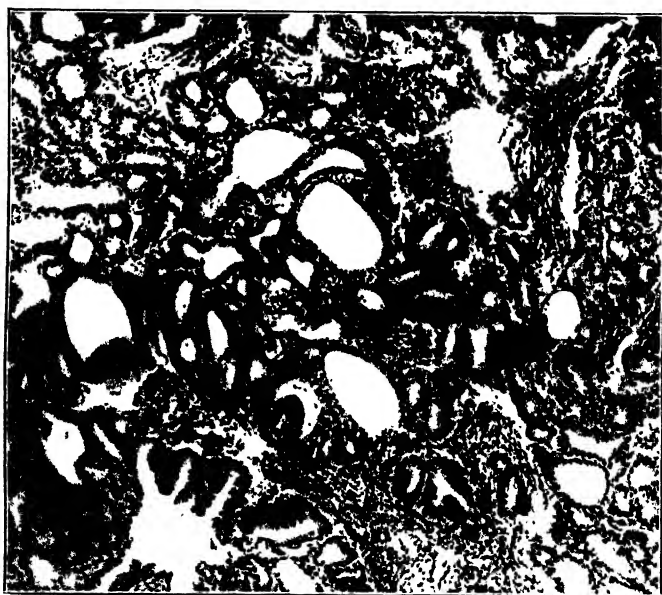


FIG. 120.—Early adeno-carcinoma of the body of the uterus.

returns, death will occur from one or other of the following causes :—

- (1) Uræmia from compression of the ureters.
- (2) Septic absorption from the sloughing tumour.
- (3) Peritonitis from the same cause.
- (4) Anæmia due to long-continued hæmorrhage, or syncope from a sudden attack due to the ulceration of the walls of a blood-vessel.
- (5) Intestinal obstruction due to extension of the cancer to the intestines.
- (6) Secondary infection of the lungs.
- (7) Simple exhaustion.

Treatment.—The treatment of all forms of malignant disease of the uterus is identical, and will be discussed later (v. page 207).

CARCINOMA OF THE CERVIX.—Cancer of the cervix may be either squamous-celled, when the growth starts in the portion of the cervix

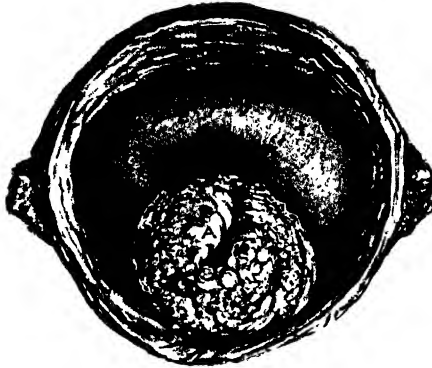


FIG. 121.—Epithelioma of cervix in an early stage, seen from below.

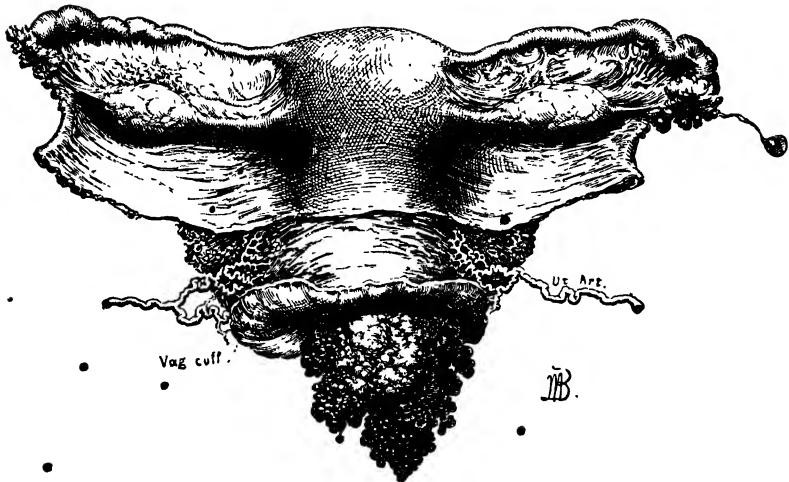


FIG. 122.—Papillary squamous-celled cancer of cervix in a more advanced stage. ($\frac{1}{2}$ scale.) (Clark.)

which is covered by compound squamous epithelium, or cylindrical-celled, when it starts as an adeno-carcinoma from the cervical glands. Squamous-celled cancer, or epithelioma of the cervix, is much more common than is cancer of the body, and may occur at any time between the ages of twenty-five and sixty. Practically speaking, it is only met with in women who have borne children.

Pathological Anatomy.—Clinically, cancer of the cervix is met with in one of three forms :—

(1) A papillary or proliferating form, in which a warty, cauliflower-like mass is found projecting downwards into the vagina. This is usually a squamous-celled growth (v. Figs. 121—123).

(2) An ulcerative form, in which the malignant growth, starting in the cervical canal, has extended outwards into the cervical and paracervical tissue, without invading the external mucous membrane (v. Fig. 125). In the later stages the mucous membrane becomes



FIG. 123.—Epithelioma of the cervix growing in the posterior lip (mesial section).
A. Area of disease.

involved, and the entire cervix is eaten away, so that on passing a finger into the vagina a large cavity is found at the top, resembling an inverted crater (v. Fig. 124). This may be either a squamous or cylindrical-celled growth.

(3) A nodular form, in which the disease starts as one or more small kernel-like masses in the cervical tissue (v. Fig. 126). As these masses come to the surface and increase in size, the nodular condition disappears and a papillary mass is formed. This is usually a cylindrical-celled growth.

Cancer of the cervix does not often extend into the body of the uterus, but cases have been recorded in which nodules of squamous-celled cancer have been found in the body, or in which there has been a direct connection with pre-existing cancer of the cervix (Figs. 127, 129).



FIG. 124.—Squamous-celled cancer of the cervix with extension to the vagina, showing extensive ulceration of the cervix tissue. (Natural size.) (Cullen.)



FIG. 125.—Squamous-celled cancer of the cervix, showing only vaginal involvement of the vaginal portion, seen from below. (Natural size.) (Cullen.)

Symptoms.—The symptoms resemble those of cancer of the body. In the early stages, they may be very slightly marked, the unfortunate

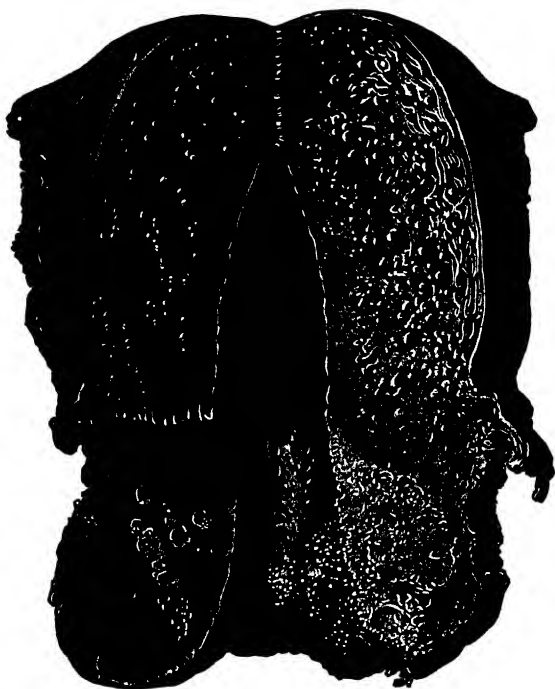


FIG. 126.—Adeno-carcinoma of the cervix, showing nodular masses in the cervical tissue, and only slight involvement of the mucous membrane of the vaginal portion of the cervix. (Natural size.) (Cullen.)

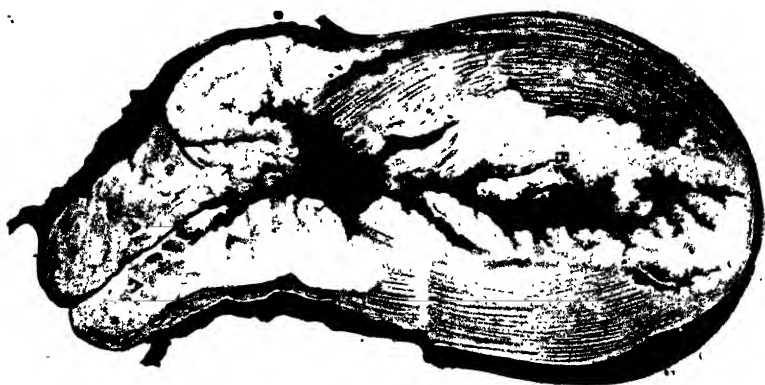


FIG. 127.—Adeno-carcinoma of the cervix, invading both body B and cervix A.

result of which is, that frequently a patient does not obtain medical advice until it is too late for anything to be done. The later symptoms are the result of the invasion of the neighbouring organs by the growth.



FIG. 128.—Adeno-carcinoma of cervix. Section of nodule growing in the cervical mucous membrane. (Wyder.)

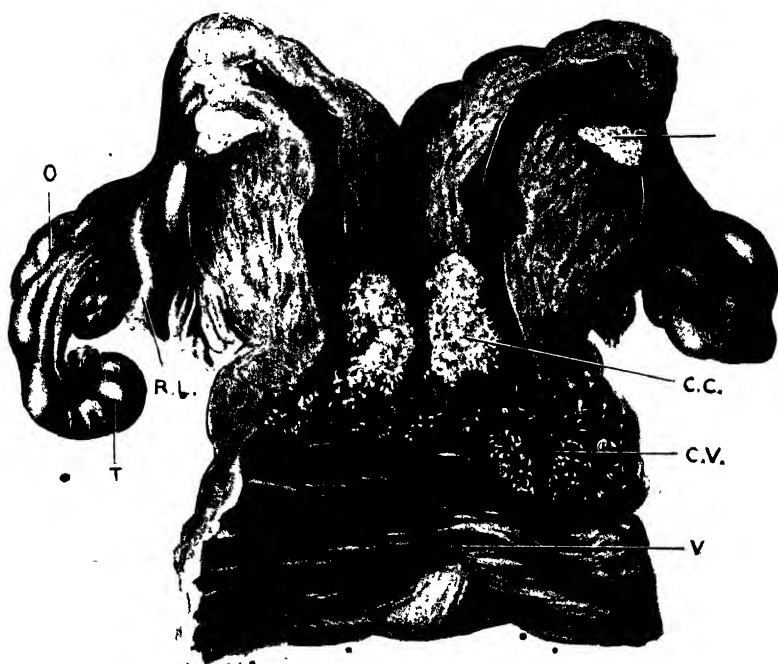


FIG. 129.—Epithelioma of cervix with secondary deposit in the fundus. C.C. Cervical cancer. C.V. Extension to vagina. V. Vagina. C.F. Extension to fundus. (From a specimen removed by the author.)

Uræmia may occur from obstruction of the ureters, intestinal obstruction or a recto-vaginal fistula from involvement of the rectum, or a vesico-vaginal fistula from involvement of the bladder. Finally, metastatic growths may occur throughout the body.

Prognosis.—The prognosis in cancer of the cervix, even after early operation, is rather worse than the prognosis in cancer of the body, inasmuch as the liability to its return seems to be greater. When operation is not performed, or when the growth returns after operation, the causes of death are the same as in cancer of the body.

Treatment.—The treatment of uterine cancer will be discussed later (*v.* page 207).

SARCOMA OF THE UTERUS.

Sarcoma usually occurs during the child-bearing period. In this respect it differs from cancer, which is more common near the menopause. It is also very much rarer than cancer, and, of the different forms, cervical sarcoma is the rarest.

Varieties.—Three forms of uterine sarcoma are met with:—

- (1) Cervical sarcoma, or cystic myxo-sarcoma of the cervix.
- (2) Spindle-celled sarcoma of the muscular coat of the uterus, or fibro-sarcoma.
- (3) Round-celled sarcoma of the endometrium.

Pathological Anatomy.—Cervical sarcoma starts as a collection of polypi, resembling mucous polypi, hanging from the cervix. These polypi are soft, semi-cystic, and grow rapidly, until finally the mass resembles a bunch of grapes (*v.* Fig. 130). Cervical sarcoma may also occur as a more diffuse form, clinically resembling squamous-celled carcinoma. Spindle-celled fibro-sarcoma starts in the thickness of the muscular coat of the uterus, and grows in a circumscribed manner. It is doubtful whether this form starts as a sarcoma, or whether it is the result of sarcomatous degeneration taking place in a pre-existing myoma. Round-celled sarcoma of the endometrium occurs in two varieties:—as a localised sessile or pedunculated growth which grows rapidly (Fig. 131), and as a diffuse malignant degeneration which affects part of or the entire endometrium. In the pedunculated variety a sarcomatous polypus possessing all the macroscopical characteristics of a benign fibrous polypus may hang down into the vagina, a fact which emphasises the importance of examining microscopically all forms of polypoid growths from the cervix or from the uterine cavity. The sarcoma breaks down readily.

Symptoms.—The symptoms of the cervical form are at first very slightly marked, but, as the sarcoma grows, symptoms result similar

to those found in cancer of the cervix. The circumscribed fibro-sarcoma causes at first symptoms like those of a myoma, save that it grows more rapidly. At a later stage, it gives rise to the usual

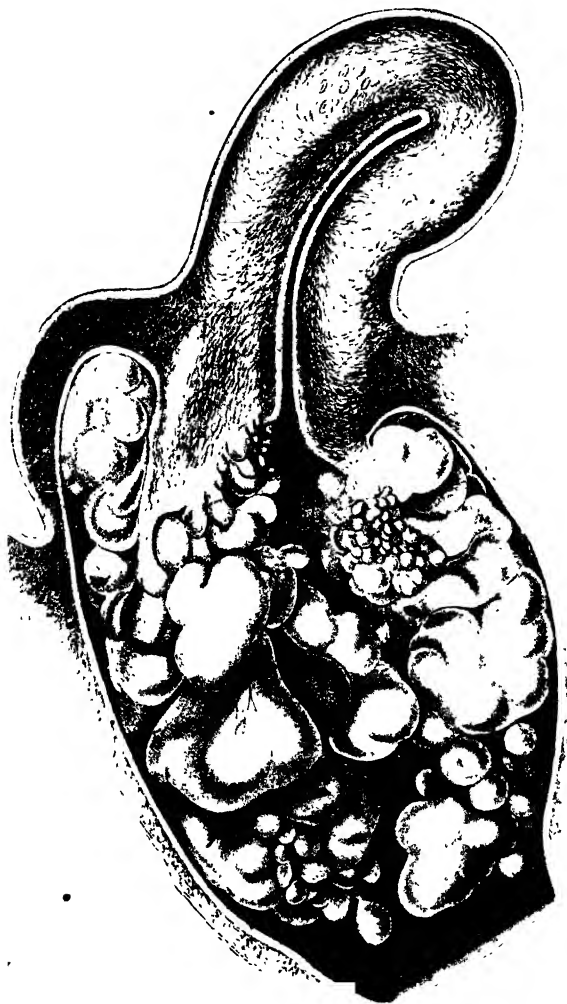


FIG. 130.—Cystic myxo-sarcoma, or grape-like sarcoma, of the cervix.
(Küstner.)

symptoms of malignant disease. A pedunculated sarcoma of the endometrium gives rise at first to no particular symptoms. Diffuse sarcoma of the endometrium causes similar symptoms to cancer of the body, with perhaps the exception that the pain is less. A tolerably common accompaniment of this form of sarcoma is hæmato-

metra, *i.e.*, an accumulation of blood in the uterus, the result of the cervix becoming occluded by the growth of the tumour.

Diagnosis.—The diagnosis of cervical sarcoma can usually be made from the characteristic appearance of the growth hanging from the cervix. In sarcoma of the body, the uterus is more or less uniformly enlarged according as the disease is far advanced or not. If the disease has spread beyond the uterus, infiltrating masses can be felt in the pelvic connective tissue. When the growth has reached this stage, its further course resembles that of cancer.



FIG. 131.—Early sarcoma of the body of the uterus. (Natural size.) (Gullen.)

In the early stages, the diagnosis can seldom be made without a microscopical examination. Fibro-sarcoma and pedunculated sarcoma of the endometrium are very likely to be mistaken for myomata.

Prognosis.—The prognosis is more favourable than that of cancer if the case is operated on at a comparatively early stage, as sarcoma generalises itself less rapidly. In cases which are not operated upon, the prognosis is the same as that of cancer, and death usually comes about in a similar manner.

Treatment.—The treatment of uterine malignant disease will be discussed later (*v.* page 207).

ENDOTHELIOMA AND PERITHELIOMA OF THE UTERUS.

Endothelioma of the uterus, though not recognised until within the last few years, is probably not as rare as is generally supposed. It



FIG. 132.—Sarcoma of the uterus, invading the peritoneum at A. Secondary growth in the broad ligament at C.

may occur anywhere in the uterine wall, but in most of the recorded cases the cervix has been the part affected. Both macroscopically and microscopically endothelioma closely resembles carcinoma, but the

cells of which it is composed are endothelium, and not epithelium. In most cases the tumour originates in the endothelium lining the lymph canals, but in some cases, known as *peritoneal cancer*, it starts in the peritoneum. Endothelioma of the cervix, starting from the lymph-canals, bears a close resemblance to the ordinary epithelioma. The mucous membrane is, however, intact, and the nodules of the tumour are buried in the cervical wall. Later on, as the tumour enlarges, ulceration occurs. Under the microscope the tissue appears to be made up of patches of large flat cells, each patch being in direct relation to a lymphatic space. The cells are not as large as those found in

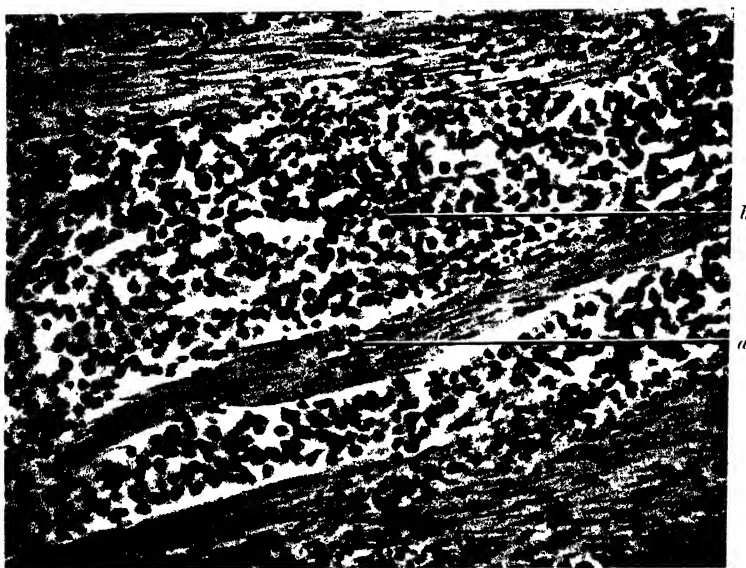


FIG. 133.—Sarcoma of the uterus. *a*. Muscle of uterus. *b*. Sarcoma cells infiltrating the muscle. $\times 400$. (Wigham.)

squamous cancer, and there is not the same tendency for atypical forms to occur. The glands are unaffected.

When the tumour starts in the endothelium of the peritoneum, the cells are similar to the normal cells of the peritoneum. A direct continuity may be traced between the peritoneum and the infiltrating masses of cells. The uterus undergoes a uniform enlargement. There is a great tendency to dissemination throughout the peritoneal cavity.

Perithelioma is an endothelial tumour originating in the cells lining a capillary blood-vessel. A collection of cells, many layers deep, is arranged radially round each vessel. In its course, this tumour closely resembles the ordinary endothelioma.

Diagnosis.—The diagnosis between these tumours and the more

common forms of malignant disease can only be made by microscopic examination, after removal of the tumour.

Treatment.—The treatment is similar to that of cancer of the uterus (*v.* page 207).

CHORION-EPITHELIOMA.

Chorion-epithelioma is the term applied to a malignant growth which starts in the uterus, presumably from the foetal membranes; invades the uterine wall; causes metastases in other organs; and quickly brings about the death of the patient.

Ætiology.—The ætiology of chorion-epithelioma was for a long time

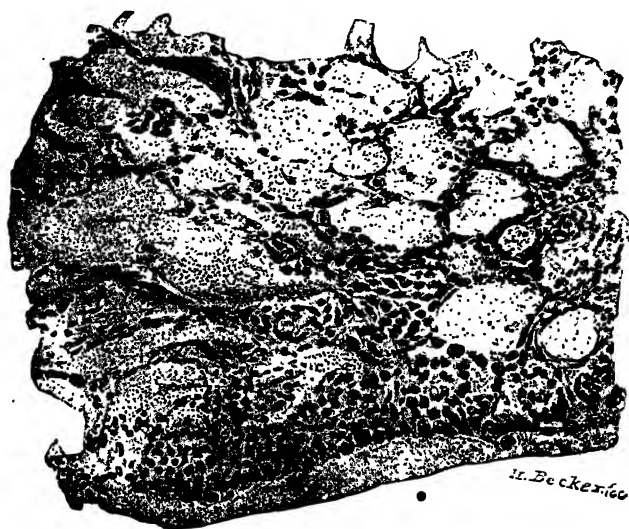


FIG. 134.—Chorion-epithelioma, showing alveolar arrangement of the primary tumour. $\times 60$. (Williams.)

most obscure, and many different theories were brought forward to account for it. Now, however, it is generally recognised that the tumour arises from both layers of epithelial covering of the chorionic villi. These layers are known respectively as the syncytium and the trophoblast. They are both derived from the trophoblast, *i.e.*, the layer of cells that invest the very early ovum.

The growing trophoblast, as was long suspected, possesses the power of invading and destroying the maternal tissues up to a certain point, where apparently the resistance of the maternal tissues becomes sufficient to check this action and an equilibrium is established. Sometimes, however, this resistance is ineffective, and the growth of the epithelial layers continue with or without accompanying invasion of the maternal tissues. In the case of the simple vesicular mole,

the epithelial layers proliferate, but their power of maternal invasion is not increased. In the malignant vesicular mole, all the elements of the villi proliferate and invade the uterine wall, the epithelial layer, however, being apparently the active agent of destruction. In the pure chorion-epithelioma, the epithelial layers alone proliferate and invade the uterine wall, and no trace of the mesoblastic core of the villus is found.



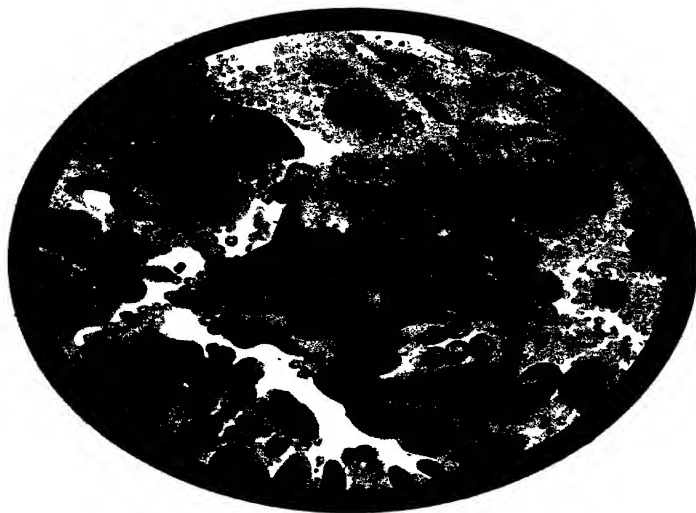
FIG. 135.—Chorion-epithelioma filling the uterus. A. Ovary. (From a specimen removed by the author.) (Drawing borrowed from author's "Manual of Midwifery.")

Pathological Anatomy.—The growth at first appears as a pedunculated or sessile tumour, varying in size between that of a pea and that of an orange. It is attached to the uterine wall and bulges somewhat into the uterine cavity. In consistency, it is friable and easily broken down by the curette; it is greyish in colour and marked here and there by large hæmorrhagic areas. As it grows, it extends into the uterine muscle, and spreads along it in isolated nodules over which the mucous membrane is at first unaltered. Finally, however, the mucous membrane lining a great part of the cavity becomes involved and

Plate VIII.



Chorion epithelioma of the uterus. X 84. (Jolly).



Chorion epithelioma of the uterus. X 450. (Jolly).

destroyed. The entire cavity then becomes filled by a fungating mass of placenta-like substance, which breaks down readily under the finger or curette, and bleeds freely (Fig. 135). Metastatic growths are the result of emboli carried along in the blood-stream, or of the direct implantation of fragments of the growth on wound-surfaces. They



FIG. 136.—Chorion-epithelioma. Secondary deposits in the lung. A. Vaginal deposit (full size). (Drawing borrowed from author's "Manual of Midwifery.")

are found most commonly in the lungs and vagina, also in the broad ligaments, and in the liver, heart, and other viscera (v. Fig. 136).

The histological character of the growth demands some consideration. Speaking generally, the growth is found to be composed of blood-clot, cellular elements, and chorionic villi. The cellular elements are of two types:—Large polyhedral cells, which stain lightly, and whose large nuclei show a wide intra-nuclear network, divided from

Langhans' layer. Multinucleated deeply staining protoplasmic masses of all varieties of shape, whose nuclei are extremely rich in chromatin and show no wide intra-nuclear network as in the other cells, derived from the syncytium.

On section of the tumour, three areas may be determined microscopically :—

(1) A submucous or peripheral area, which forms the main bulk of the tumour mass, and is often necrotic in character. It is composed of fibrin and cellular elements in all stages of degeneration.

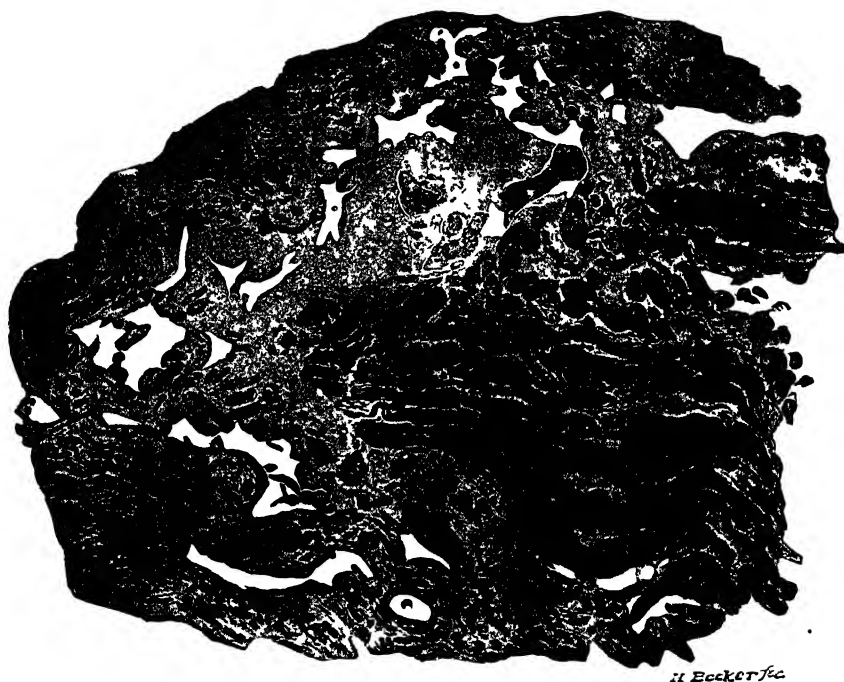


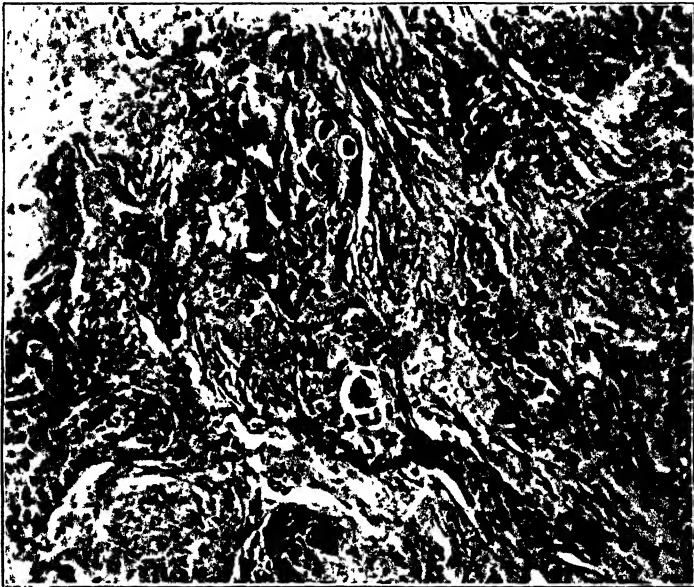
FIG. 137.—Chorion-epithelioma, showing syncytial masses invading a venous channel. (William's)

(2) A cellular area, constituting the tumour proper, which is composed entirely of actively proliferating cellular elements and chorionic villi mixed with free uncoagulated blood.

(3) An area of infiltration in which may be seen cells and protoplasmic masses, isolated and in groups, insinuating themselves into the blood channels and surrounded by the muscle fibres of the uterine wall. In this area, chorionic villi are not found.

Symptoms.—The earliest symptom of chorion-epithelioma consists in a recurrence of irregular hæmorrhages within a few weeks after an abortion or the expulsion of a vesicular mole. In a few cases, the

hæmorrhage does not begin until some months after the abortion, but this is quite exceptional, and, in such cases, it is possible that in the interval the patient has had another abortion. The hæmorrhage is, as a rule, considerable in amount. In the intervals between the attacks, there is a more or less fœtid, watery, and blood-stained discharge. Each day the patient's general condition becomes worse, as a result of the hæmorrhages, and cachexia is caused by absorption from the necrosing growth, and at a later stage by the occurrence of metastases. Her temperature rises as soon as intra-uterine decomposi-



• FIG. 138.—Chorion-epithelioma of uterus. The tumour-cells are all of Langhans' type, syncytial elements being absent.

tion occurs, and assumes a hectic type. Usually, the first symptom of metastases is the occurrence of a persistent cough due to extension to the lungs, auscultation of which will reveal the existence of patches of consolidation. At the same time metastases may appear in the vagina. They occur as small dark-red or purple tumours which vary in size from that of a pea upwards, and which closely resemble thrombosed veins.

On vaginal examination, the cervix is found to be sometimes closed and sometimes patulous. If the finger is passed into the uterine cavity, a fungating growth is felt which more or less fills the cavity according to the stage it has reached, and which breaks down readily under the finger. The body of the uterus enlarges rapidly in propor-

tion to the growth of the tumour, and may rise above the level of the pelvic brim.

Diagnosis.—The diagnosis of chorion-epithelioma is not difficult, once our attention is directed to the possibility of its presence. We cannot draw attention too strongly to the necessity for careful bimanual examination in all cases in which hæmorrhage recurs after pregnancy. If the uterus is not enlarged, it will be sufficient to curette it and examine the scrapings microscopically, but, if it is enlarged, the finger should be passed into it and the cavity explored. A chorion-epithelioma may, in an early stage, be confounded with a small submucous myoma; a distinction can be made by noting the ease with which, in the former case, the growth is broken down with the finger or curette. In a later stage, it may be mistaken for portions of retained and decomposing, placental tissue. As the retention of such fragments is always possible after abortion or labour, this is a very natural and probable mistake to make. It can, however, be avoided, first, by noting that it is impossible to remove all the fungating mass which fills the uterine cavity in the case of a chorion-epithelioma, while this as a rule can easily be done in the case of retained portions of placenta; and, secondly, by submitting the removed fragments to a competent pathologist for examination. In selecting portions for microscopical examination, the superficial parts of the growth must be avoided, as these usually consist of little but necrosed tissue and blood-clot. The characteristic appearances will only be found when the removed portion comes from the neighbourhood of the spreading edge of the growth.

Treatment.—The treatment of chorion-epithelioma is similar to that of other forms of malignant disease of the uterus. If operation is possible it must be performed at the earliest moment on account of the rapidity with which metastases form. The patient from whom Figs. 135 and 136 were made died within three days of the first appearance of any signs of pulmonary involvement. The presence of metastases is not always a contra-indication to operation, as it is believed that sometimes they are absorbed or otherwise destroyed by the surrounding tissues; consequently, hysterectomy should be performed whenever the condition of the patient offers a hope that she will be able to stand the attendant shock.

Prognosis.—The prognosis in chorion-epithelioma, which is not operated upon, is, so far as we at present know, absolutely bad, death occurring within a period varying from some weeks to six months, according to the rapidity with which the tumour grows. Death may be directly due to hæmorrhage, to septic absorption, or to metastatic pneumonia. If the uterus has been completely removed, and there are not any metastases present, the prognosis is good.

THE TREATMENT OF MALIGNANT DISEASE OF THE UTERUS.

Malignant disease of the uterus must always be treated, no matter what its form, in the most radical manner possible under the circumstances of the case. If the growth is not so far advanced as to render its removal impossible, radical abdominal hysterectomy accompanied by the removal of the glands into which the uterine lymphatics drain is definitely indicated. If hysterectomy can be successfully carried through, even though every fragment of the growth cannot be removed, many operators consider it is still indicated, on account of the painful symptoms that accompany the spread and the breaking down of the primary growth and the comparatively less distressing symptoms that attend a recurrence when the primary growth has been removed. If hysterectomy is out of the question, then removal of as much of the growth as possible, by means of the curette or the cautery, must be carried out as will be described. By so doing, not alone the comfort of the patient, but also her life, are somewhat prolonged. The only conditions under which no local treatment should be adopted are where the patient is already so exhausted by the growth of the disease that the administration of an anæsthetic is impossible, or where one fears even to scrape away the prominent parts of the growth on account of the danger of making a fistula communicating with the bladder or rectum.

The modern operative treatment of cancer of the uterus consists in the removal of the uterus as a whole, accompanied by the removal of the broad ligaments and of as much of the parametric tissue as can be dissected out, also of as much of the vagina as is involved in the growth, and finally of the glands into which the uterine lymphatics drain. These glands are principally to be found round the iliac vessels and just below the bifurcation of the aorta, and in some cases it may also be necessary, if possible, to remove the glands lying beside the lumbar aorta. The type of hysterectomy that is almost invariably performed in these cases is that introduced by Wertheim. This operation is carried out by the abdominal route, and allows a very free dissection of the uterus and of the pelvic glands. Occasionally, when the disease has extended a considerable way down the vagina, it may be advisable to associate with the Wertheim hysterectomy a complete extirpation of the vagina. Such a procedure necessarily adds to the length of the operation, and therefore is not desirable unless it is essential. It does not, however, add quite as much as might be expected, because, although the vaginal extirpation takes time, still, as it facilitates the subsequent hysterectomy, the total time is not so long.

If the disease is too extensive to permit of a radical cure, then

temporary relief can be afforded by curetting and cauterising the interior of the uterus or the cervix and the upper part of the vagina, as the case may be. If this procedure is properly carried out, all the superficial parts of the growth are removed, and, as a result, great benefit is caused by checking for the time being the sanious discharge and the hæmorrhage. Of late the treatment of cancer of the uterus by means of radium has received a great deal of attention, and apparent cures of inoperable cases have been recorded.

OPERATION.

The following operation will be discussed here :—

CURETTING AND CAUTERISATION OF IRREMOVABLE MALIGNANT DISEASE.

The most suitable treatment of malignant disease of the uterus or vagina which is too advanced for radical treatment, and which causes hæmorrhage or profuse foetid discharge, is afforded by curetting away the malignant growth so far as possible, and then cauterising the walls of the resultant cavity.

Indications.—All cases of inoperable malignant disease, accompanied by hæmorrhage or foetid discharge, in which the extent of the growth is not so great as to render it impossible to carry out the treatment without opening into the peritoneal cavity, the bladder, or the rectum, are benefited by this treatment. In some cases the benefit may last for only a few weeks, but in other cases, in which the cancer is slow-growing, benefit may be obtained for many months or even longer.

Instruments.—The following instruments are required :—A large posterior speculum ; three vaginal retractors of vulcanite or some other substance which is a bad conductor of heat ; a large and sharp curette ; a thermo-cautery ; plugs of cotton wool soaked in a fifty per cent. solution of chloride of zinc, and dried as far as possible ; plugs soaked in a saturated solution of bicarbonate of soda.

Operation.—The first step consists in carefully determining the extent of the growth and its relations to the rectum and bladder by means of a bimanual recto-vaginal examination, and by passing a sound into the bladder. If the anterior vaginal wall is involved, the interior of the bladder should be examined with Nitze's cystoscope, to see if its mucous membrane is also involved. If this precaution is neglected an opening may be easily made through the bladder wall in an advanced case. The site of the malignant disease—which is usually the cervix—is then exposed, and as much of the growth as can be safely removed is torn away with the curette. The cavity thus formed is next cauterised

thoroughly with the thermo-cautery—using a large-sized platinum point at a cherry-red heat—until the hæmorrhage which resulted from the curetting is almost stopped. The cavity is then dried as thoroughly as possible with plugs of cotton wool, and while dry is filled with small plugs of the same material soaked in a fifty per cent. solution of chloride of zinc. These plugs should be prepared the night before, in order that they may be dry. The plugs are only placed in the cavity, and must not come in contact with the vaginal mucous membrane. The last step consists in filling the vagina with plugs soaked in a saturated solution of bicarbonate of soda, in order to neutralise any chloride of zinc which may trickle down.

Complications.—The complications, which may occur, are due to the too extensive action of the caustic. In this way, openings may be made into the bladder or the rectum, or into the peritoneal cavity if the caustic has been introduced into the uterus. Such accidents are of course irremediable, owing to the general condition of the surrounding structures.

After-treatment.—The plugs are removed on the fifth day, unless it is desired to produce only a superficial effect, in which case they are removed on the first or second day. As a rule, there will be a profuse foetid discharge for several days, until the slough caused by the caustic separates. To check this discharge, vaginal douches of peroxide of hydrogen, sanitas, or permanganate of potash may be given twice daily. As a rule, the patient's temperature rises as a result of absorption from the sloughing area, and she may suffer some pain. For the latter morphia may be given, and for the former stimulants. The general health of the patient should also be well maintained by suitable nourishment. Tonics, such as iron and strychnine, are usually indicated. As soon as all the sloughs have come away and the discharge has ceased, the patient's health often undergoes considerable temporary improvement.

CHAPTER XI.

DISEASES OF THE FALLOPIAN TUBES.

Inflammatory Diseases of the Tubes. Salpingo-oophoritis—Ætiology—Pathological Anatomy: Salpingitis—Acute Salpingitis—Chronic Salpingitis: Cystic Changes in the Tube: Oophoritis—Acute Oophoritis—Chronic Oöphoritis. Tuberculosis of the Tubes. New Growths of the Tubes: Benign Neoplasms—Malignant Neoplasms. Tubal Pregnancy.

THE following are the principal pathological conditions met with in the Fallopian tubes :—

- Inflammatory diseases.
- Tuberculosis.
- New growths.
- Tubal pregnancy.

INFLAMMATORY DISEASES OF THE TUBES.

Inflammatory diseases of the tubes may exist alone, or may co-exist with a similar condition of the ovaries. The symptoms, and the physical signs to which each condition gives rise, are practically identical, whether they exist separately or co-exist. Accordingly, it will be best to describe the two under the heading *salpingo-oöphoritis*, but the distinctive lesions of each structure must be described separately. Tuberculosis of the ovary and tube will be discussed under this head also, as it is impossible in the great majority of cases to distinguish, without the aid of the microscope, tuberculous lesions from those produced by pyogenic bacteria.

SALPINGO-OÖPHORITIS.

Salpingo-oöphoritis (σάλπιγξ, a trumpet; ᾠόν, an egg; φέρω, I bear), in some of its forms, is the most frequent and important result of bacterial infection of the pelvic contents.

Ætiology.—Salpingo-oöphoritis is always bacterial in origin, though in many cases, at the time of operation, the presence of bacteria cannot be detected. In such cases the invading bacteria have produced their effect, and have then disappeared, killed by the toxins they produce.

The origin of the infection in the greater number of cases is a previous metritis, which in turn has been caused by the extension of infection

upwards from the vagina. In this manner, gonorrhœal and puerperal infections of the tubes occur. In other cases, infection occurs directly from the intestine, or through lymphatics which run in the ligament connecting the right ovary with the vermiform appendix (Vallin). In such cases, ovarian infection may precede the tubal infection, while in the case of extension of infection from the uterus the reverse is the case. Tuberculous infection may occasionally occur as an extension of a primary infection* of the uterus or pelvic peritoneum, but primary infection of the tube is the more common occurrence.

In addition to these modes of infection, salpingo-oöphoritis has followed infective diseases, as—typhoid, measles, scarlatina, cholera, smallpox, and influenza. In such cases, it is probably closely connected with the acute metritis which also has been found in association with these diseases. Syphilis and actinomycosis must be added as very rare causes.

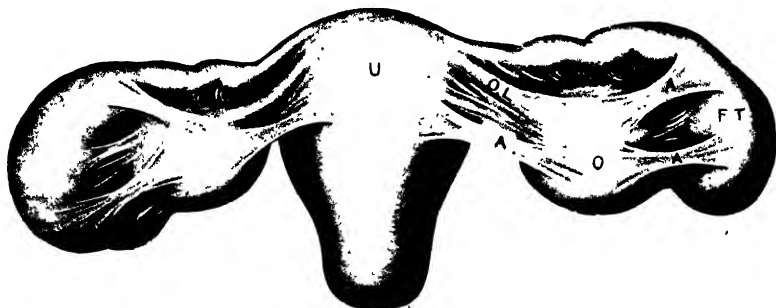


FIG. 139.—A typical case of salpingo-oöphoritis. U. Uterus. O. Ovary. O.L. Ovarian ligament. F.T. Fallopian tube. A. Adhesions.

Pathological Anatomy.—In the greater number of cases, salpingo-oöphoritis is a bilateral condition. This is due to the proximity in which the appendages lie to one another; also to the fact that, when the uterus is the source of the infection, it is unlikely that such infection will extend into one tube and spare the other. Similarly, if the tube becomes infected, extension to the ovary sometimes occurs, also owing to their close proximity (v. Fig. 151).

It is surprising how frequently healthy, or comparatively healthy, ovaries may be associated with marked tubal infection. Thus, in ninety-nine patients operated on by the author, in only twelve were both ovaries so diseased as to require removal, in nineteen one ovary had to be removed, and in sixty-eight neither ovary had to be removed. This is an important point to remember, as it makes a great difference to the subsequent comfort of the patient if even a portion of an ovary can be left. We shall refer to this subject again.

In order to discuss the various forms under which tubal and

ovarian inflammations are met, it will be necessary to consider the pathological anatomy of salpingitis and oöphoritis separately.

SALPINGITIS.—Two clinical varieties of salpingitis (σαλπιγξ, a trumpet) are met with :—

(A) Acute salpingitis.

(B) Chronic salpingitis.

(A) **Acute Salpingitis.**—Both acute and chronic salpingitis can be divided into endosalpingitis and interstitial salpingitis, according as the infection attacks the mucous membrane or the muscular coat.

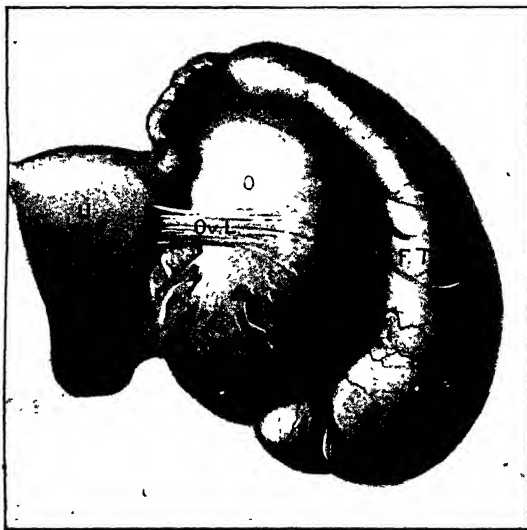


FIG. 140.—A tubo-ovarian cyst, the result of salpingo-oöphoritis. u. Uterus. o. Ovary. F.T. Fallopian tube. ov.L. Ovarian ligament. (From a specimen in the Pathological Laboratory, Trinity College, Dublin.)

In acute salpingitis, however, the two forms so commonly occur in conjunction that it does not seem to be necessary to make such a distinction.

For instance, in a typical case of gonorrhoeal salpingitis, an acute infection spreading upwards from the uterus may, in one patient, cause primarily an endosalpingitis, in another patient an interstitial inflammation. Whichever of these started first will, as a rule, be quickly followed by the other, and the two conditions will co-exist. The pus which forms in the tubes gradually escapes into the uterus or into the peritoneal cavity, if the turgescence of the mucous membrane near the ends of the tubes does not completely block the ostia. If, on the other hand, the outflow of pus is obstructed, owing to the blocking

of both ostia of the tube, the pus accumulates, and finally the tube is converted into a pus-containing sac, and the condition known as pyosalpinx (*πύον*, pus; *σάλπιγξ*) results.

As the pus continues to accumulate, the walls of the tube become gradually thinner, until finally all trace of their previous structure disappears (*v.* Fig. 142), nothing remaining but a fibrous sac.

The macroscopical appearance of a tube in the early stages of acute endosalpingitis is not very striking. The tube is slightly enlarged, congested, and œdematous; and on cutting it open, the mucous membrane is seen to be thickened and inflamed. There is a small amount of muco-purulent or purulent fluid in the cavity. The fimbriæ are swollen and covered with flakes of lymph, and there may be some friable adhesions in process of formation between the tube and intes-

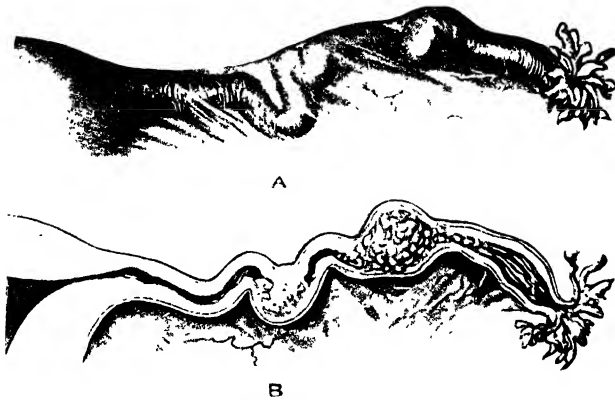


FIG. 141.—A. Marked elongation of the tube, the result of salpingitis. B. Nodular salpingitis.

tines. The length of the tube is usually increased without a corresponding increase in the length of the peritoneal coat. As a result of this the elongated tube may be thrown into a series of worm-like coils under the peritoneal coat (*v.* Fig. 141, A.). Each coil feels like a nodular enlargement of the tube, and may be mistaken for it. It is important to distinguish between the two, as in the condition just described the lumen of the tube is usually uninterrupted, whereas in "nodular salpingitis" it is almost invariably blocked. If there is an interstitial inflammation present as well, as is usually the case, the tube may be enlarged up to the size of a finger, and minute points of pus may be seen scattered about in the thickness of the walls. The tubal enlargement at this stage is due to marked thickening of the muscle wall of the tube and to hyperplasia of its connective tissue, and not to dilatation of the cavity. As a rule, the abdominal ostium becomes partially or completely closed, and the

mechanism by which this occurs is worthy of note. In some cases, the fimbriæ, spread out fanwise, become adherent to some neighbouring structure, as the ovary, the back of the broad ligament, or the floor of Douglas' pouch. In other cases, the muscular and serous coats lengthen, and bulge over the fimbriæ until each ostium appears as a rounded orifice with smooth instead of fringed margins. These margins gradually contract and occlude the opening. In the early stage, if the rounded end of the occluded tube is slit up, the fimbriæ will be found crowded inside the tube. The usual consequences of this closure are the accumulation of pus in the tube and



FIG. 142.—Section through the wall of a pyosalpinx. Note the complete disappearance of mucous membrane.

the formation of a pyosalpinx. This condition will be discussed later under the head of cystic changes in the tube.

The microscopical appearance of the tube in acute salpingitis is as follows :—The sub-epithelial layer of the mucous membrane is infiltrated with small round cells, and the vessels are dilated ; as a result, there is a marked increase in the size of the folds of the mucous membrane (v. Figs. 143—145). On the surface of the folds are seen small vegetations, which tend to become adherent one to the other and so to cause the formation of crypts in the walls. If the infection has extended beyond the mucous membrane, the walls of the tube are greatly thickened, owing to hypertrophy and hyperplasia of the

muscle and the connective tissue, and to a round-celled infiltration and vascular dilatation. In the walls are seen minute points of pus, and colonies of the infecting bacterium may be found in the lymphatic interspaces. The changes, which occur in the wall of the tube when the latter becomes cystic, will be discussed later.

(B) **Chronic Salpingitis.**—Chronic salpingitis occurs as the sequence of an attack of acute salpingitis, or in consequence of a less virulent infection than that which causes acute salpingitis. Two forms of chronic salpingitis are met with :—



FIG. 143.—Acute salpingitis of septic origin. *a*. Fibro-muscular wall of tube. *b*. Dilated blood-vessel. *c*. Fold of mucous membrane showing dilated vessels. *d*. Purulent exudate. *e*. Lumen of tube. $\times 6$. (Wigham.)

- (1) Chronic endosalpingitis, or catarrhal salpingitis, *i.e.*, inflammation of the tubal mucous membrane.
- (2) Chronic interstitial salpingitis, *i.e.*, inflammation of the walls of the tube.

The two forms usually co-exist in those cases which are the result of an attack of acute salpingitis, but one or other form predominates.

(1) **Chronic Endosalpingitis.**—Chronic endosalpingitis ($\epsilon\acute{\nu}\delta\omicron\rho$, within ; $\sigma\acute{\alpha}\lambda\pi\iota\gamma\acute{\iota}\varsigma$), or inflammation of the mucous membrane lining the tube, is, in those cases in which it exists alone, most frequently the result of a subacute infection. If such is the case, a serous catarrhal inflammation results, and, if the ostia of the tube become blocked, the condition known as hydrocalpinx ($\upsilon\delta\omega\rho$, water ; $\sigma\acute{\alpha}\lambda\pi\iota\gamma\acute{\iota}\varsigma$) results. If the infection

is pyogenic in character, and the outflow of pus is prevented, a pyosalpinx may result, as in the acute condition.

(2) *Chronic Interstitial Salpingitis*.—Chronic interstitial salpingitis causes extreme thickening of the walls of the tube, so that the tube may reach the size of a finger or even more without any dilatation of its lumen.

There is an interesting condition known as nodular salpingitis, which is probably a final stage of chronic salpingitis, but which cannot be conveniently included under the head of either endosalpingitis or interstitial salpingitis. In this condition, nodules are to be found at



FIG. 144.—Acute salpingitis (low power).

intervals along the tube, separated from one another by portions of tube which may be of normal size or somewhat thickened. These nodules vary in size from a tenth of an inch to half an inch in diameter, and their effect is to give the tube somewhat the appearance of a rosary. They are caused in some cases by localised hypertrophy and hyperplasia of the tubal wall, and in other cases by the formation of small cysts lined with epithelium and apparently arising from the tubal mucous membrane. They may also be caused by small collections of calcified detritus or fibrous tissue (v. Figs. 141, B. and 146) left by old and healed tuberculous lesions. The origin of the nodules is probably in all cases tuberculous or gonorrhœal. In most cases they com-

pletely occlude the lumen of the tube, and in other cases they so compress it as practically to obliterate it. This condition must not be confused with the apparent nodules caused by lengthening of the tube with consequent coiling of it beneath its peritoneal coat, as has been already described (Fig. 141, A.).

Cystic changes in the tube.—When the closure of the abdominal ostium of the tube is associated with the continued formation or collection of fluid in the tube, cystic dilatation results. To this condition the term *sacto-salpinx* (*σακτός*, crammed; *σάλπιγξ*) has been applied. This term embraces three different conditions :—



FIG. 145.—Acute salpingitis, showing exudate of pus between the plicæ of the tube, and infiltration of the mucous membrane with leucocytes (high power).

- (1) *Pyosalpinx*—a tube distended with pus.
- (2) *Hydrosalpinx*—a tube distended with clear water-like fluid.
- (3) *Hæmatosalpinx*—a tube distended with blood.

The first two of these are probably always the result of inflammatory changes in the tube, while the third may be the result of inflammatory changes, but usually is not. It is, however, convenient to discuss it here with the others.

The shape of a sacto-salpinx is very characteristic. The tube becomes retort-shaped, the larger end of the retort corresponding to the outer third of the tube, the narrower end to the uterine insertion. In a typical case the fimbriæ have disappeared from view, and the outer

end of the sacto-salpinx is smooth and rounded. The walls have usually undergone pressure atrophy in proportion to the amount of fluid formed, and, in very advanced cases, may be so distended as to be almost translucent. The remaining changes depend upon the contents of the tube.

(1) *Pyosalpinx*.—A pyosalpinx is the result of the accumulation of pus in a tube whose abdominal ostium is closed. The uterine ostium is usually patent, but the escape of fluid is prevented by the swollen condition of the mucous membrane. The peritoneum is thickened, and is usually adherent to the neighbouring peritoneum. The muscle

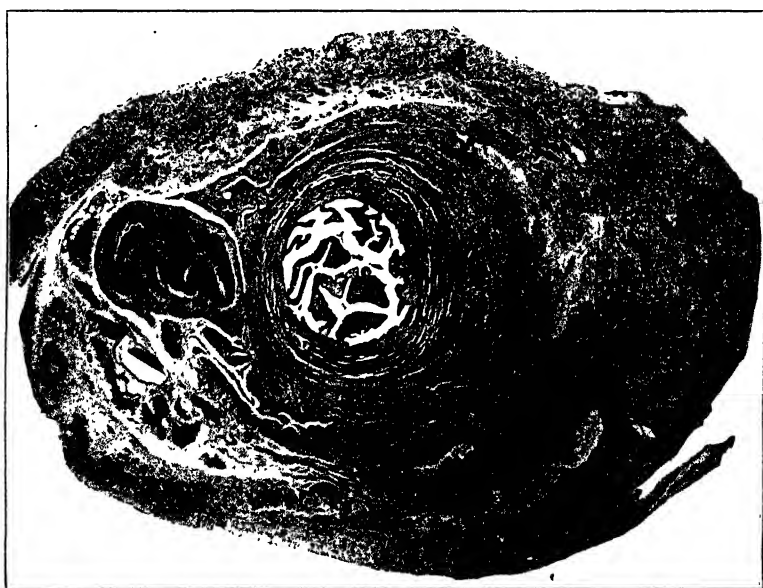


FIG. 146.—Nodular salpingitis. Section through fibrous nodule in the wall of the tube, possibly the result of a former tuberculous infection.

wall is at first thickened, but, as increased quantities of pus form, it becomes thin and atrophic. The mucous membrane is usually destroyed and replaced by granulation tissue, which finally changes into a smooth fibrous lining. The fluid contained in the tube consists of pus, mucus, and small quantities of blood. Calcareous deposits, cholesterol, degenerated epithelial cells, and granular debris may also be present.

(2) *Hydrosalpinx*.—The origin of a hydrosalpinx is by no means easy to explain. The usual and probably the correct explanation attributes it to the result of a subacute inflammatory salpingitis, which causes the outpouring of a serous fluid into the tube. Another

explanation is that a hydrosalpinx is the remains of a pyosalpinx in which the pus cells have undergone fatty degeneration and disappeared, leaving the watery portion of the fluid behind. There are many difficulties in the way of accepting this explanation. As in a pyosalpinx, the abdominal ostium of the tube is closed, while the uterine ostium may be sufficiently patulous to allow drops of fluid to be forced through it by pressure upon the tube.

A tubo-ovarian cyst is the condition in which a cyst of the ovary communicates with a cystic tube, so that there is free passage of fluid between the two (v. Fig. 140). The mode of origin of these cysts is obscure, and many different theories have been suggested to account



FIG. 147.—Follicular salpingitis. The epithelium has fallen away from the wall of some of the cystic spaces. $\times 70$. (Wigham.)

for them. The simplest of these attributes them to the adhesion of a cystic tube to a cystic ovary, and the subsequent and gradual absorption of the wall intervening between the two cysts.

Similar changes may occur in the peritoneum covering the tube in hydrosalpinx as in pyosalpinx, but, as a rule, the signs of an acute inflammation are absent, and the peritoneum is smooth and glistening. The muscle wall shows very little sign of inflammation, and, as the amount of fluid increases, becomes gradually thinner. The mucous lining similarly undergoes pressure atrophy, save in the follicular form, in which it presents the changes already mentioned.

The fluid in a hydrosalpinx contains albumin, granular debris, and a few leucocytes and degenerated epithelium. It is of low specific gravity—1005–1010. Its reaction is neutral or alkaline, and in general appearances it resembles blood serum.

(3) *Hæmatosalpinx*.—A hæmatosalpinx (ἄμα, blood; σάλπιγξ) is not usually due to tubal infection, but still it is convenient to discuss it here. It may be caused in three ways :—

(a) By the rupture of the wall, or of vessels in the wall, of the sac of a tubal pregnancy. This is very much the most common cause.

(b) By the retention of menstrual blood as a result of a congenital or acquired atresia of some part of the genital passages.

(c) By the rupture of vessels in the wall of the tube in a case of catarrhal or interstitial salpingitis.

Various changes sometimes take place in the contents of a cystic tube. Thus, a hydrosalpinx may be converted into a pyosalpinx; or, on the other hand, it is said that a pyosalpinx, by the gradual absorption of its cellular contents, may be converted into a hydrosalpinx. Similarly, hæmorrhage may occur into the sac of a pyosalpinx



FIG. 148.—A pyosalpinx which has become twisted. U. Uterus. T. Tube. B.L. Broad ligament. ("Rotunda Hospital Report," 1896-7.)

or tubo-ovarian abscess; or the contents of a hæmatosalpinx may become infected and suppurate, thus leading to the formation of a pyosalpinx.

2. The contents of a cystic tube or tubo-ovarian abscess may escape. This can occur in two ways :—either by the fluid making its way downwards into the uterus through the uterine end of the tube, or by rupture of the sac. In the former case, the escape of fluid may occur at intervals, according as the intra-tubal pressure becomes sufficiently great to overcome the resistance offered to its outflow by the swollen mucous membrane. This condition is sometimes termed *Hydrops tubæ profluens*, and has been already described. Moreover, a tube may burst owing to over-distension or violence, especially during a bimanual examination or any surgical interference. A ruptured tube may discharge its contents into the general peritoneal cavity, into a loculus in the pelvis between adhesions, between the layers of the broad ligament, or into any of the neighbouring hollow viscera, most frequently perhaps the rectum.

3. A third change consists in torsion of the tube, as not infrequently occurs in the case of ovarian cysts. In the case of the dilated tube, however, torsion is a much rarer condition, owing to the manner in which the broad ligament becomes thickened by inflammatory infiltration. This change is particularly prone to occur in a large hydrosalpinx which is not held in place by adhesions, as is usually the case in pyosalpinx.

OÖPHORITIS.—Two varieties of oöphoritis (*ωóv*, an egg; *φορέω*, I bear) are met with—

(A) Acute oöphoritis.

(B) Chronic oöphoritis.

(A) **Acute Oöphoritis.**—Acute oöphoritis occurs in three forms :—



FIG. 149.—A. Ovary showing chronic hypertrophic oöphoritis (actual size). B. Ovary of normal size for comparison.

(1) Acute cortical oöphoritis, i.e., inflammation of the superficial tissue. It is usually the result of gonorrhœa.

(2) Acute parenchymatous oöphoritis, i.e., inflammation of the follicles. It most frequently occurs after infectious diseases.

(3) Acute interstitial oöphoritis, i.e., inflammation of the interstitial tissue. It is usually a gonorrhœal, or a puerperal septic, process.

(B) **Chronic Oöphoritis.**—Chronic oöphoritis occurs as the sequel of an acute infection, or is a chronic process from the beginning. It is found in several forms, as follows :—

(1) Chronic cortical oöphoritis, consisting in the formation of new connective tissue in, and consequent thickening of, the cortical layer of the ovary. It is usually the result of an acute cortical oöphoritis, but sometimes occurs without any apparent connection with an antecedent infection.

(2) Chronic interstitial oöphoritis, a later stage of cortical oöphoritis, in which a new growth of connective tissue extends all through the ovary. It is probably always a chronic process from the start. It

not infrequently occurs in association with myomata of the uterus and of very chronic backward displacements.

(3) Chronic hypertrophic oöphoritis, the term applied to a still later stage, in which there is so great a formation of new connective tissue that a marked increase in the size of the ovary results. It also occurs in association with uterine myomata.

(4) Atrophic oöphoritis, the term applied to the last stage, which may supervene upon hypertrophic oöphoritis, as a result of the



FIG. 150.—Long rectal diverticulum found in association with a double pyosalpinx. D. Diverticulum arising from pelvic colon. A. Vermiform appendix. P.C. Pelvic colon. U. Uterus.

shrinkage of the new connective tissue. The condition is also known as cirrhosis of the ovary. In it, the invasion of the ovary by the new connective tissue is complete, and there is consequently a disappearance of all normal ovarian structure.

In addition to these changes in the tube and ovary, various changes take place in the surrounding structures, especially in the pelvic peritoneum. There is always a considerable amount of pelvic peritonitis present in acute cases, and usually in chronic cases also. The result is that numerous adhesions are formed between the different pelvic organs, and also between them and the intestines. To a large extent these adhesions are beneficial, as they tend to prevent the

spread of the infection into the general peritoneal cavity, should the tube or ovary rupture.

In addition to pelvic adhesions, it is very common to find small collections of pus lying in loculi between the adhesions. There is also, very commonly, in these cases a slight amount of parametric thickening, especially in the layers of the broad ligament.

Symptoms.—The symptoms of salpingo-oöphoritis depend, in the first instance, on whether the condition is in an acute or chronic stage. In the acute stage, the symptoms closely resemble those of acute pelvic peritonitis. The temperature and pulse-rate are high, and the abdomen is swollen, tympanitic, extremely painful, and tender over the lower portion. The patient may also suffer from occasional rigors and vomiting. If the case is a favourable one, the acute symptoms



FIG. 151.—A tubo-ovarian abscess.

gradually subside within a fortnight, and the condition passes into its chronic stage. On the other hand, a general septic peritonitis may ensue due to the non-limitation of the infection by adhesions. The occurrence of abdominal pain in cases of acute pelvic infection is a sign of good import, as it usually shows that adhesions are forming, and that hence the danger of the infection spreading to the peritoneal cavity is diminishing.

In chronic cases, the symptoms are so variable that it is, as a rule, impossible to make a diagnosis by their means alone. Generally speaking, they may be said to consist of a varying degree of pelvic pain, menstrual disturbance, usually menorrhagia and metrorrhagia, and general ill-health. If both tubes are affected, sterility will result. In the case of an intermitting pyosalpinx or hydrosalpinx, an escape of pus or serous fluid into the uterus will occur at intervals. If the tumor is of large size and occupying Douglas' pouch, there may be marked constipation from pressure upon the rectum, while, if extensive intestinal adhesions have formed, there may be partial obstruction due to kinking of the intestines.

Diagnosis.—The diagnosis of acute salpingo-oöphoritis can be usually made in non-puerperal cases from the symptoms. In puerperal cases, on the other hand, the condition is very likely to be confounded with acute metritis. The pain of salpingo-oöphoritis is more severe, and the tenderness more distributed over the entire pelvis than in metritis.

The diagnosis of chronic salpingo-oöphoritis can only be made from the results of a bimanual examination taken in conjunction with the previous history of the case. Sometimes, however, it is not possible to differentiate between small ovarian cysts and appendages that are inflamed and matted together. In such cases, a diagnosis is only made when the tumour is being removed. The characteristic points of inflamed appendages are :—

(1) In cases of salpingitis without retention, the tube is felt to be thickened, and may attain the size of the middle finger. It may be coiled on itself in such a manner as to include the ovary ; both are then usually prolapsed to the bottom of Douglas' pouch.

(2) In cases of salpingitis with retention, *i.e.*, pyo- or hydro-salpinx, the tubes and ovaries, intimately connected with one another, fill Douglas' pouch. If they have reached a considerable size, the posterior vaginal fornix is displaced downwards. On passing the finger into the rectum, the tumour is felt to be cystic in parts ; and, if there is an appreciable exudate in Douglas' pouch or beneath the pelvic peritoneum, the rectum will feel as if it was compressed all round by a comparatively hard and unyielding collar. This investment of the rectum is also found in cases of contracting retro-uterine hæmatocele.

(3) The tumour in Douglas' pouch is usually fixed by adhesions. In some cases, these adhesions are very easily broken down ; in other cases, they are extremely dense.

(4) A groove between the tumour and the uterus can be sometimes felt from the vagina, and a groove between the two sets of appendages can be felt from the rectum.

A pyo- or hydro-salpinx must be distinguished from the following conditions :—

(1) A tubal pregnancy, a hæmatosalpinx, a hæmatoma of the broad ligament, or a retro-uterine hæmatocele, especially one which has been partially absorbed.

(2) Small ovarian or parovarian cysts, particularly those which burrow between the layers of the broad ligament.

(3) Subserous myomata of the posterior uterine wall, especially if they are complicated by the existence of pelvic peritonitis.

(4) Coils of intestines adherent in Douglas' pouch.

A pyosalpinx is usually, though by no means invariably, bilateral ; a hæmatosalpinx, hæmatoma, or tubal pregnancy, is rarely, if ever,

bilateral. Small ovarian cysts growing in the layers of the broad ligament are extremely difficult to distinguish from cystic tubes, unless the history of the patient furnishes considerable information. Subserous myomata are closely connected with the uterus, and move readily with it.

Prognosis.—Mild attacks of salpingo-oöphoritis may get well, and leave the appendages functionally perfect. More commonly, however, the inflammation subsides leaving the fimbriated extremity or the lumen of the tubes permanently obliterated, and in these cases sterility is absolute. So long as the inflammation persists, especially in cases of pyosalpinx, there is always a danger of the limiting adhesions yielding; or of the tube itself bursting, and a general peritonitis resulting. In most cases of pyosalpinx, there is attendant ill-health from the absorption of toxins, and there is a continual danger of a recrudescence of the acute stage owing to re-infection of the contents from the rectum or intestines.

Treatment.—The treatment of acute salpingo-oöphoritis is practically the same as the treatment of acute metritis. That is to say,—rest in bed, warm vaginal douches, hot applications over the hypogastrium, purgatives, ichthyol and glycerine plugs in the vagina—if the patient will stand the necessary manipulations, and the use of anodynes if the pain is very severe. Operative measures while the patient is in the acute stage are usually contra-indicated, on account of the danger of infecting the general peritoneal cavity, unless the patient is becoming steadily worse as the result of absorption from the tube, or unless there is a large accumulation of pus. In such cases, the pus sac should be opened from the vagina, and drained.

The treatment of chronic salpingo-oöphoritis falls under two heads :—

(A) Palliative treatment.

(B) Radical treatment.

(A) **Palliative Treatment.**—Palliative treatment consists in adopting such measures as will give temporary relief to the pain, will bring about a diminution of the inflammation, and will tend to correct the various displacements of the pelvic organs which may be present. This treatment may give satisfactory results if there are no accumulations in the tubes, and if the symptoms are not very severe, but, as a rule, it is unsatisfactory. It consists, at first, in the use of hot douches, glycerine and ichthyol plugs, and anodynes. Curetting has also been recommended, and will at any rate afford relief to such symptoms as are due to the accompanying metritis.

In cases of pyosalpinx or ovarian abscess, in which the infection is still active, it may be necessary to open into the abscess sac from the vagina, evacuate its contents, and then plug the cavity with iodoform gauze. This is a less serious operation than the total removal of the

appendages, but is only palliative. If it is necessary to operate on an acute case, vaginal drainage is the best mode of procedure, as it lessens the risk of causing a general infection. The subsequent extirpation of the appendages will, however, be most probably required. In chronic cases, on the other hand, preliminary drainage is rarely necessary, and radical treatment may usually be at once adopted.

(B) **Radical Treatment.**—The radical treatment of salpingo-oöphoritis consists in the adoption of one or other of the following measures:—

- (1) Conservative operations on the appendages, with the object of removing the diseased portion of the ovary, and of creating a new ostium to the tube if the fimbriated extremity has become obliterated.
- (2) The removal of the inflamed appendages.
- (3) The removal of the inflamed appendages and the uterus.

(1) A conservative operation, with the object of retaining a portion of the ovary, and of restoring the abdominal ostium of the tube—salpingostomy, is in all cases the operation of choice, as, when successful, it leaves the patient with generative organs which are capable of functioning. It cannot, however, be successfully carried out in the presence of very advanced disease of the appendages, nor is it wise to attempt to carry it out in the presence of a still active infection. It, therefore, must be limited to cases in which active infection is not present, and in which it is possible to remove the diseased portions of the appendages without removing the latter completely. Most cases of hydrosalpinx are suitable for salpingostomy, unless the tubal enlargement is very great, as a moderately enlarged tube will return to an almost normal size almost immediately after the escape of its contents.

Conservative operations in the case of the tube consist in the restoration of its abdominal ostium—salpingostomy, in the restoration of its lumen, and in the removal of impervious portions when the lumen cannot be restored. Conservative operations in the case of the ovary consist in resection of the diseased portions, and in ignipuncture or simple puncture of small cysts, also in the division of controlling adhesions or of the peritoneal covering of an elongated tube when it causes coiling and kinking. Conservatism in the case of the tubes is not so important as in the case of the ovaries, because, while the preservation of the tube only affects the patient by allowing pregnancy to occur, the preservation of the ovary affects her in a similar manner, and also enables the internal secretion to continue and to prevent the onset of a premature menopause. It has been proved beyond doubt that the retention of even the smallest portion of normal ovarian tissue is a factor of importance in assuring the future comfort of the patient.

(2) The removal of one or more of the appendages is necessary when conservative treatment is impossible owing to the extent of the disease, or inadvisable owing to the presence of an active infection. We must always endeavour not to remove more than is necessary. The tubes and ovaries may be removed by the abdominal or by the vaginal route. If the infection is still active, as shown by the persistence of pyrexia, the vaginal route is safer if operation cannot be postponed, as it is not attended by the same risk of setting up a general peritoneal infection. If, however, there is no reason to think that the infection is inactive, the abdominal route is decidedly the better one, as it enables us to discriminate more accurately between what must be removed and what can be spared, and to leave the pelvis in a more normal condition at the end of the operation.

(3) The removal of the uterus in addition to the removal of the inflamed appendages is strongly recommended by many operators, on the grounds that, in cases of bilateral disease of the appendages, the uterus is so much diseased that, if it is not removed, the patient is only half cured: and that, subsequent to removal of the appendages, its retention is not of any benefit to the patient. Our own experience shows that complete bilateral removal of the appendages is very seldom necessary, and that when it is necessary, the uterus sometimes may be so diseased as to require removal, but that this is by no means invariably the case. Our advice is to remove the uterus if its condition necessitates removal, and to do so quite independently of the condition of the appendages.

Whatever form of radical treatment is adopted, all intestinal adhesions must be carefully separated, the uterus freed if it is adherent, and some form of hysteropexy performed in order to prevent it from again falling back and forming fresh adhesions. In all cases of pelvic infection the vermiform appendix must be carefully examined, and if it is found in any way abnormal it must be removed.

TUBERCULOSIS OF THE TUBES.

Tuberculosis of the Fallopian tubes is the commonest form of primary tuberculosis met with in women, if pulmonary tuberculosis is excluded. It appears to occur as a primary condition, but may also be the result of extension from the uterus or from the abdominal peritoneum. Tuberculosis is the commonest cause of pyosalpinx in virgins.

Pathological Anatomy.—In most cases of salpingitis due to tuberculous infection, the macroscopic appearances are not characteristic, but are very similar to those of non-tuberculous salpingitis. In some cases, however, miliary tubercles are scattered over the peritoneal covering, and are similar to those seen in general tuberculous peritonitis. Nodules



FIG. 152.—Tuberculous salpingitis. Tubercles, with giant cells and degenerate areas, in plicae of tube.

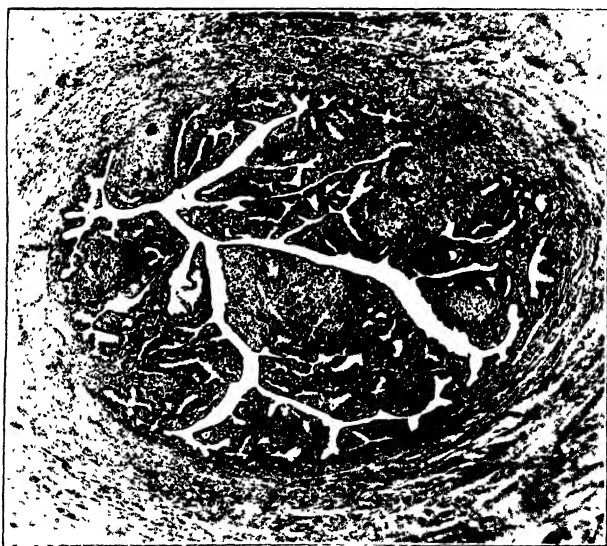


FIG. 153.—The same tube as shown in Fig. 152. The fibrosed wall is also seen.

may also occur at intervals along the tube, as has been described under the head of nodular salpingitis. In cases in which the infection has started in the endosalpinx, the characteristics of endosalpingitis

are present in the early stages. Later, interstitial salpingitis follows, and the tube wall becomes greatly thickened and is riddled with patches of caseous degeneration and minute abscesses. The tubes usually contain pus. On microscopical examination, the changes typical of tuberculous infection will be found. If the infection was slight in extent, and the resistance of the patient considerable, the bacilli



FIG. 154.—Tuberculous salpingitis. The tube is thickened, and the fimbriae swollen. Miliary tubercles are seen in serous coat and on fimbriae.

may be dead. In such cases we may find calcareous nodules scattered at intervals along the tube.

Treatment.—Tuberculous tubes should always be removed completely. The fact that their occurrence is so common is a strong reason for the early removal of all cases of pyosalpinx. If the ovaries are also involved, they must be removed as well, and in such a case removal of the uterus is also advisable. If, however, the ovaries can

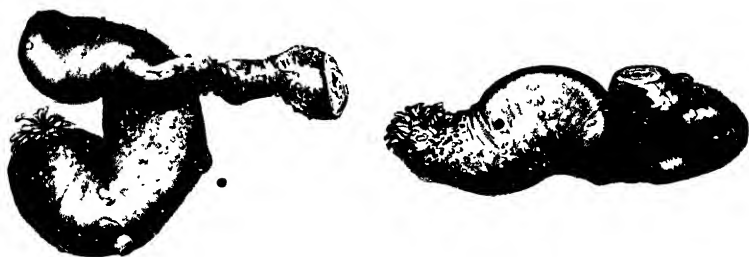


FIG. 155.—Double tuberculous pyosalpinx. Both tubes are tortuous and contain pus. The fimbriae are infolded and occlude the ostia. Miliary tubercles are seen in serous coat.

be left, the uterus may sometimes be left too, even in the presence of tuberculous disease of the endometrium. The treatment of such cases has been already discussed.

NEW GROWTHS OF THE TUBES.

The benign neoplasms of the tubes are few in number, and are not of any great clinical importance. Myoma, papilloma, adenoma, are all said to occur. Dermoid tumours have been positively recorded, including one case in which the tumours were bilateral.

Such conditions can only be recognised after removal of the appendages, or during the operation itself. As their removal is the correct treatment, the diagnosis of the actual condition prior to the operation is not a matter of great importance.

The malignant neoplasms of the tubes are equally rare. Instances of primary sarcoma and carcinoma have been recorded. Secondary involvement of the tubes by extension from the uterus or ovaries may sometimes occur, but even this is not common. If there is any reason to suspect the existence of malignant disease, an exploratory abdominal celiotomy should be performed.

TUBAL PREGNANCY.

Tubal pregnancy can hardly be said to be a disease of the tubes, though in all probability its occurrence is permitted by inflammatory conditions of the tubes associated with incomplete blocking of the ostia. As it is an obstetrical, rather than a gynaecological, condition, it will be more properly discussed in books on obstetrics.

CHAPTER XII.

DISEASES OF THE OVARIES.

Alterations in Function—Displacements—Undescended Ovary—Hernia of the Ovary—Ascent of the Ovary—Descent of the Ovary—Inflammatory Diseases of the Ovary—Tuberculosis of the Ovary—New Growths of the Ovary—Retention Cysts—Epithelial Tumours—Mesoblastic Tumours—Dermoid Cysts and Teratomata—Complex Tumours.

THE following are the principal pathological conditions met with in the ovary :—

Alterations in function.
Displacements.
Inflammatory diseases.
Tuberculosis.
New growths.

ALTERATIONS IN THE FUNCTION OF THE OVARY.

Up to comparatively recent years the main, if not the only, function of the ovaries was considered to be ovulation, that is, the production of ova. Now, however, it is generally recognised that, in addition to this function, there is another which is equally important. This function is to produce an internal secretion. Accordingly, the alterations or errors in function on the part of the ovary must be divided into two groups, as follows :—

- (1) Errors of ovulation.
- (2) Errors of internal secretion.

(1) **Errors of Ovulation.**—There is little to be said regarding errors of ovulation. Presumably, the latter may be either normal, excessive, or insufficient. With normal ovulation we are not here concerned. Excessive ovulation one can only assume to occur, but we are ignorant as to whether it will be attended by any symptoms or not. Insufficient ovulation or absence of ovulation will favour or cause sterility.

(2) **Errors of Internal Secretion.**—It is probable that the secretion possesses certain psychical, vasomotor, and general metabolic properties, also that it is responsible for gross changes in the other ductless glands. Furthermore, it is probable that it assists in the elimination of calcium salts, and that the secretion of the corpus

luteum has an important controlling effect on the embedding of the ovum and the subsequent progress of pregnancy.

The effects produced by excessive ovarian secretion are seen mainly in alterations of the sexual functions, of the characteristics, and of the psychology of the woman, and of the general metabolism. Thus, in this condition we find increased and prolonged menstruation, increased sexuality, sometimes of a perverted character, excessive femininity, and various other minor derangements; while, as far as the general metabolism is concerned, there is believed to be an abnormally large excretion of calcium salts, and this during pregnancy and lactation may lead to a softening of the bones, as is met with in osteomalacia. In ovarian insufficiency, on the other hand, the symptoms that may be met are mental irritability or instability, flushing, perhaps cardiac distress, the increased deposition of fat over the body, and the retention of calcium salts in the tissues. Occasionally, too, there may be changes in the other ductless glands, especially the thyroid and pituitary bodies, resulting in such conditions as exophthalmic goitre and myxœdema.

Treatment.—So far as we know at present, there is no treatment possible for errors of ovulation. The treatment of errors of internal secretion is possibly more satisfactory. Where the secretion is excessive, injections of suprarenal and pituitary extract have been tried, sometimes with benefit. This is particularly the case in the treatment of osteomalacia, where most satisfactory results have been obtained from the systematic injection of adrenalin.

The treatment of ovarian insufficiency, on the other hand, is very unsatisfactory. Ovarian extracts made both from the whole organ and from the corpus luteum have been tried, also extracts from certain of the other ductless glands. As a rule, however, they do not produce much benefit. Ovarian transplantation has been tried, but so far it is generally found that only autogenous grafts are of benefit; that is to say, the treatment can only be adopted in the case of patients from whom it is found necessary to remove both ovaries, and as in such cases it would be much simpler to leave a piece of each ovary if healthy, the treatment is naturally of little value.

DISPLACEMENTS OF THE OVARY.

The normal position of the ovary is thus described by Schaltze:—
 “The ovaries lie close to the uterus on each side within the true pelvis, their long axes . . . parallel to the lateral wall of the pelvis, and nearly so to the median plane. They . . . extend upwards from the uterus, their lateral attachments to the brim of the pelvis being higher than their connections to the uterus. They lie with their superior

extremities in the plane of the pelvic inlet, close beneath the inner edge of the ilio-psoas muscle, which, when in momentary contraction, is the best guide for the external hand in bimanual palpation of them."

Under the head of displacements of the ovary, four conditions are included :—

- (A) Undescended ovary.
- (B) Hernia of the ovary.
- (C) Ascent of the ovary.
- (D) Descent or prolapse of the ovary.

(A) **Undescended Ovary.**—The ovaries, like the testicles, are found in the embryo close to the kidneys, from which position they gradually descend to their permanent site. The non-occurrence, or the arrest, of this process of descent gives rise to the condition known as undescended ovary, and, as a result, the latter may be found anywhere between the kidneys and the pelvic brim.

(B) **Hernia of the Ovary.**—Ovaries, either alone, or in company with the tube, intestines, or omentum, may be found in the sac of an inguinal, femoral, ventral, gluteal, ischiatic, or obturator hernia. Hernia of the ovary alone is known as an *oöphorocele*, of both ovary and tube as a *salpingo-oöphorocele*, and of the tube alone as a *salpingocele*.

The diagnosis of an ovarian or tubal hernia prior to operation is usually impossible. All hernie in the female call for radical cure, and the suspicion of the presence of a tube or ovary in the sac only makes such a procedure more positively indicated.

(C) **Ascent of the Ovary.**—Ascent of the ovary as a pathological condition is due to :—

- (1) Tumours of the ovary.
- (2) Tumours in Douglas' pouch, or in the broad ligament, so situated as to push the ovary upwards.
- (3) Tumours of the uterus, such as myomata
- (4) The formation of peritoneal adhesions round the ovary or the fimbriated extremity of the tube during pregnancy, which prevent these structures from returning to their normal position as the uterus involutes.

Ascent of the ovary is not in itself a condition of any great clinical importance. Its treatment is that of the condition which causes it.

(D) **Descent of the Ovary.**—Descent or prolapse of the ovary may occur in one of two directions—posteriorly either into the pouch of Douglas or the sub-ovarian fossa, or anteriorly into the vesico-uterine pouch. The latter condition is the result of the formation, and subsequent shrinkage, of adhesions which tend to drag the ovaries

into the anterior pouch. The former condition is more important, and to it the term "prolapsed ovary" is usually applied. In the majority of cases it is associated with a backward displacement of the uterus.

Ætiology.—The causes of prolapse of the ovary fall under two heads :—

- (1) Causes situated in the ovary or its ligaments. These are,—relaxation of the ligaments, and increase in the size of the ovary.
- (2) Causes situated outside the ovary. These are,—backward displacement of the uterus, pelvic peritonitis, and tumours pressing downwards.

Symptoms.—If the prolapsed ovary is associated with, or caused by, some other morbid condition, its symptoms are to a great extent masked by the symptoms of the accompanying condition. The symptoms which are the direct result of the prolapse are,—more or less well-marked dyspareunia (*i.e.* pain during coitus), and tenderness when a vaginal examination is made, both being found in proportion to the amount of inflammation which is present in the ovary. The degree of dyspareunia may be so great as to cause relative sterility by preventing coitus. There may be also extreme pain when the bowels move, or when walking.

Diagnosis.—The symptoms suggest the presence of prolapse, and on making a vaginal examination a round or oval and tender swelling is found behind or slightly to one side of the uterus, either about the level of the internal os or at the bottom of Douglas' pouch. This swelling can be best felt by recto-vaginal examination, whilst by bimanual examination we can recognise that the tubes are healthy, and that one or other ovary is missing from its normal place. A prolapsed ovary may be confused with a subserous myoma growing from the posterior uterine wall, a cystic tube, a loop of intestine adherent in Douglas' pouch, and a tender retroflexed uterus.

Treatment.—The treatment consists in removing—as far as possible—any condition which may favour the prolapse of the ovary, as retro-deviations of the uterus, tumours, etc., and in adopting measures calculated to remove the accompanying inflammation—ichthyol plugs, hot vaginal douches, etc. If adhesions are present and are the cause of the prolapse, it is probable that complete relief will only be obtained by opening the abdomen, separating the adhesions, and removing any diseased portion of the ovary. If, for any reason, an operation is contra-indicated, some relief may be obtained by means of massage. If there are small cystic tumours present, the diseased portion of the ovary or the whole ovary may be removed, and adhesions may be broken down at the same time.

INFLAMMATORY DISEASES OF THE OVARY.

Inflammatory diseases of the ovary have been already fully discussed under the heading Salpingo-oöphoritis.

TUBERCULOSIS OF THE OVARY.

Tuberculosis of the ovary very rarely occurs as a primary condition, and is usually secondary to tuberculosis of the tubes of the

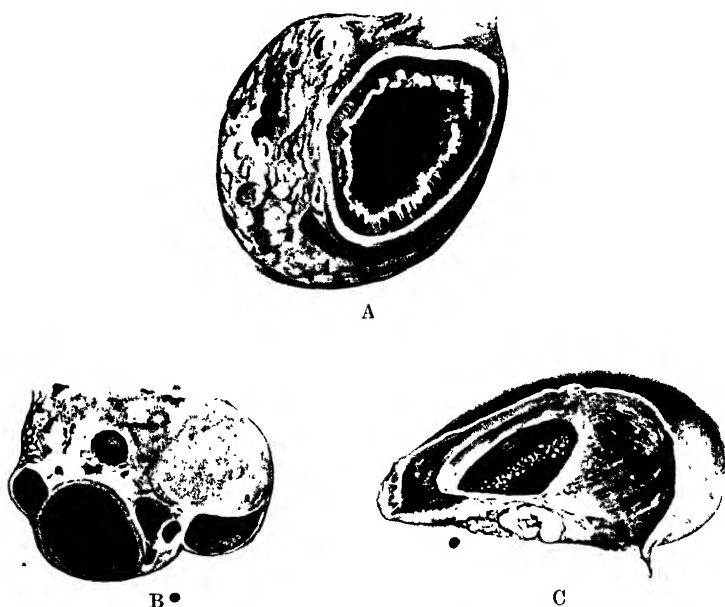


FIG. 156.—A. Corpus luteum in the ovary beginning to form a cyst. B. Graafian follicle cysts. C. Ovary containing small cyst showing papillary tufts. In the other ovary was a large cystic papillary growth.

peritoneum, or, more rarely, of other organs, as the lungs. Even then, it is rare, and in extensive tuberculous disease of the tubes, the ovaries may be quite free from infection. When ovarian tuberculosis occurs, it usually results in the formation of an ovarian abscess.

The symptoms, methods of diagnosis, and treatment, are the same as those of salpingo-oöphoritis.

NEW GROWTHS OF THE OVARY.

Tumours and new growths of the ovary may be classified as follows:—

I. Retention cysts.

II. Tumours developed from the epithelial cells of the ovary.

III. Tumours developed from the mesoblastic or connective tissue cells of the ovary.

IV. Dermoid cysts and teratomata.

V. Complex tumours.

Each of these groups will be again subdivided according to the structure of the different tumours which they comprise.

I. RETENTION CYSTS OF THE OVARY.—Two varieties of retention cysts are met with, as follows :—

(A) Cysts of the Graafian follicle.

(B) Cysts of the corpus luteum.



FIG. 157.—Cystadenoma of ovary. Loculi are filled with semi-gelatinous contents.

(A) **Cysts of the Graafian Follicle.**—These cysts occur in two different clinical forms, either as one or more fairly large cysts, or as a multitude of small cysts (*v.* Fig. 156, B). The larger cysts are known as simple cysts, in contradistinction to cysts which are true new growths. Both forms are due to the accumulation of fluid in a Graafian follicle. The multiple cysts vary in size from that of a pin's head to that of a pea, whilst the larger simple cysts may reach the size of an orange, though usually they are about the size of a hazel-nut or a walnut. Their walls are identical in structure with that of the walls of a normal Graafian follicle, and they are lined with cubical or flat epithelium. The contained fluid is thin, clear, and straw-coloured, with a specific gravity of 1005 to 1026. Occasionally, it may be tinged with blood, owing to the rupture of a small blood-vessel in the wall.

The mode of origin of these cysts is obscure. The multiple cysts are

usually found in association with chronic thickening of the capsule of the ovary, *i.e.*, chronic cortical oöphoritis, and hence this condition is sometimes called "sclero-cystic oöphoritis." The larger cysts are often found in association with myomata and long-continued backward displacement of the uterus, with salpingitis, and with pelvic peritonitis, and so it is probable that their occurrence is favoured by ovarian congestion.

(B) **Cysts of the Corpus Luteum.**—These cysts are formed in corpora lutea which have not disappeared, and in which an accumulation of fluid has gradually increased (*v. Fig. 156, A*). They may attain the size of a walnut, or become even considerably larger, but as a rule they are quite small. Their wall is composed of ovarian stroma, and of



FIG. 158.—Papillary cystoma of ovary. The tufts are almost entirely of epithelium, and secondary growths had been formed in the peritoneum.

the peculiar golden-coloured tissue characteristic of a corpus luteum, and is very friable. Their contents are usually blood clot in different stages of disintegration, and in addition leucocytes and lutein cells. Nothing is known as to their cause.

II. TUMOURS DEVELOPED FROM THE EPITHELIAL STRUCTURES OF THE OVARY.—Various theories have been put forward to account for the origin of epithelial tumours of the ovary. Of these the principal are the following:—

(1) That they arise from portions of germinal epithelium which have penetrated the ovary from its surface.

(2) That they arise from the cells of the Graafian follicle, or as some writers maintain, of the corpus luteum.

(3) That they arise from portions of the parovarium which have become included in the ovary.

(4) That they arise from ingrowths of the fimbrial cells.

(5) That they, in common with all the epithelial elements of the ovary and the interstitial parenchyma, have their origin in a structure called the *rete ovarii*, similar to the *rete testis*. This *rete ovarii* is an irregular cavity in the ovarian stroma lined with one or several layers of cubical epithelium, and is constantly found in young cows. A



FIG. 159.—A proliferating papillary cyst of the ovary, in which the papillary masses have made their way through the cyst wall. 1. Remains of ovary partially converted into a cyst, which has burst. 2. Cystic portion of ovary, its interior being filled with papillomatous growth. 3. Papillomatous masses in which the ovary is embedded. Many of these have sprouted through the cyst wall. 4. Pedicle (Roberts.)

similar structure is said to be present in the early human ovary, but under ordinary circumstances it disappears. If fragments of it persist, they are likely to be the starting-points of tumours. The relative frequency with which epithelial tumours of the ovary are bilateral gives strong support to this view.

Three varieties of epithelial tumours are met with :—

(A) Cystadenoma, or proliferating adenomatous cyst.

(B) Papilloma, or proliferating papillary cyst.

(C) Carcinoma.

We shall discuss the first two together under the head of “Proliferating Cysts of the Ovary.”

(A and B) Proliferating Cysts of the Ovary.—Cystadenoma, or

PLATE IX.



the blood-vessels and nerves of the pelvis (from a dissection by
Dr. Cecil Smyly.) ●



FIG. 160.—Proliferating adenomatous cyst of the ovary. Diagrammatic section through the wall. (H. gdr.)

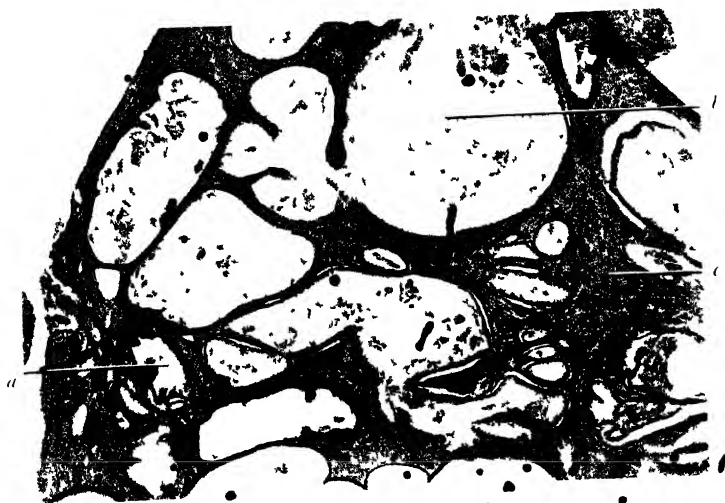


FIG. 161.—Proliferating adenomatous cyst. *a* Small space whose wall is lined with columnar epithelium. *b* Larger space, the wall lined with flattened epithelium. *c*. Interstitial connective tissue. $\times 10$. (Wigham.)

proliferating adenomatous cyst, is the commonest variety of ovarian tumour. It is a benign, cystic, and multilocular tumour, which does not tend to cause metastases, to invade neighbouring structures, or to recur locally after removal. It is usually unilateral. Papilloma, or proliferating papillary cyst, is also a cystic and multilocular tumour, and primarily is benign. If, however, it is not removed, it tends to invade neighbouring tissues, and to recur in them after the removal of the

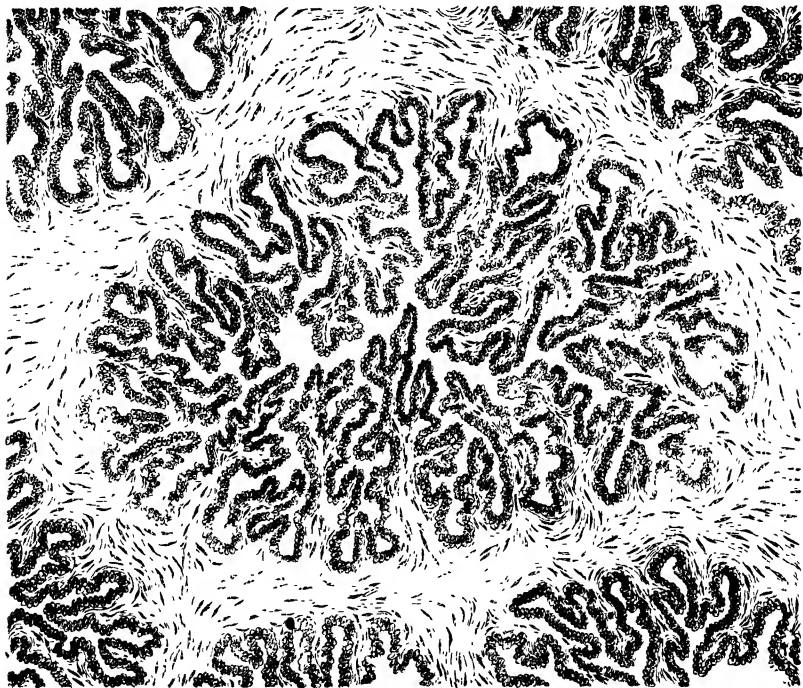


FIG. 162.—Proliferating papillary cyst of the ovary. Diagrammatic section through the wall. (Wyder.)

tumour itself. It may thus be considered to be semi-malignant. It is very frequently bilateral. Papillomata constitute about fifteen and a half per cent. and cystadenomata about forty-four per cent. of all large ovarian tumours.

Proliferating cystic tumours are always multilocular, even when, to the naked eye, there appears to be only one cavity. As the epithelial lining proliferates, it may either grow outwards into the connective tissue of the cyst wall and there form diverticula (v. Figs. 160 and 161) or, if the activity of the epithelium is sufficiently great, it may project into the interior of the cyst in the form of little ridge-like elevations (v. Figs. 162 and 163). In the former case the condition is known as

cystadenoma, or *proliferating adenomatous* or *glandular cyst*; in the latter case, as a *papilloma* or *proliferating papillomatous cyst*.

The forms assumed by proliferating adenomatous cysts are very numerous, and constitute every degree between a smooth-walled and apparently unilocular cyst and an almost solid tumour of a sponge-like structure.

Proliferating papillary cysts are luckily much rarer than proliferating glandular cysts. The essential difference between them is, that in the papillary cyst the activity and power of growth of the epithelium



FIG. 163.—Proliferating papillary cyst. *a.* Cystic space filled with papillary tufts of epithelium. *b.* Space showing papillary tufts of epithelium, and filled with mucoid material. $\times 25$. (Wigham.)

is very much more marked than in the glandular cyst. This results in the outgrowth of epithelial vegetations through the cyst wall, and in the great tendency to take on malignant action which these cysts possess. The variations in form and size are also very numerous, but they do not reach the enormous size which is sometimes reached by adenomatous cysts. The papillary groups of epithelial cells, which first appear on the interior of the cysts, afterwards tend to grow outwards, and may invade the peritoneum (*v.* Fig. 159). During the removal of such tumours it sometimes happens that papillary tufts become implanted on the peritoneal surface or in the abdominal wound, and there proliferate. From the beginning of peritoneal invasion the history of the case is one of malignant disease. As

we have said, these cysts are frequently bilateral—a fact which has a very important bearing on their operative treatment.

(c) **Carcinoma.**—Carcinoma of the ovary, as a primary condition, is by no means so uncommon as is sometimes stated. It is the most common form in which malignant disease attacks the ovary, and not infrequently arises in a mucoid cyst. In many cases, however, it is secondary to carcinoma of the breast, the uterus, the pylorus, or



FIG. 164.—Carcinoma of the ovary, probably malignant degeneration of a pre-existing ovarian cyst.

some other portion of the gastro-intestinal tract; in such cases, as in primary cancer, both ovaries are likely to be affected. Both in its primary and secondary forms, it is frequently bilateral.

III. TUMOURS DEVELOPED FROM THE MESOBLASTIC CELLS OF THE OVARY.—Four varieties of tumour developed from the mesoblastic or connective tissue cells are met with :—

- (A) Fibroma.
- (B) Myoma.
- (C) Sarcoma.
- (D) Endothelioma.

(A and B) **Fibroma and Myoma.**—The fibroma and the myoma are both rare tumours in this region, especially the myoma. Fibromata constitute about six per cent. of all large ovarian tumours. They vary in size from quite a small nodule to the size of a foetal head, and sometimes occur in association with cystadenoma. A myoma of the ovary consists of unstripped muscle tissue with which there may be a mixture of fibrous tissue. Both tumours are encapsuled, and in this way may be distinguished from sarcoma, which infiltrates the ovary.

(c) **Sarcoma.**—Sarcoma of the ovary may occur between infant life and puberty, also between the ages of twenty-five and forty-



FIG. 165.—Carcinoma of the ovary. Section of the companion ovary to that shown in Fig. 164.

five. In adults it constitutes about three per cent. of all large ovarian tumours. It may reach a comparatively large size, and is usually composed of a mixture of spindle and round cells. If one ovary is affected, the other will probably be also attacked. Ovarian sarcoma rapidly generalises itself and proves fatal. Cystic degeneration of these growths is very common, and, frequently, hæmorrhages take place into the cavities thus formed.

(D) **Endothelioma.**—Endothelioma of the ovary, like that of the uterus, may occur in either of two forms, originating respectively from the lymph canals of the organ or from the peritoneal covering. The accompanying figure (v. Fig. 168) shows a peritoneal endothelioma, which caused widespread dissemination throughout the

entire peritoneal cavity. Each of the grape-like bodies consisted of large and flat cells, indistinguishable from and continuous with those of the peritoneum covering them. In the middle of each nodule was a small cyst-like cavity, which contained clear lymph; the wall of the cavity was not specialised in any way. There was very little stroma. The secondary growths were small nodules, not unlike miliary tubercles in appearance, but identical in structure with the grape-like bodies. The condition had given rise to considerable ascites.

IV. DERMOID CYSTS AND TERATOMATA.—A dermoid (δόρμα, the

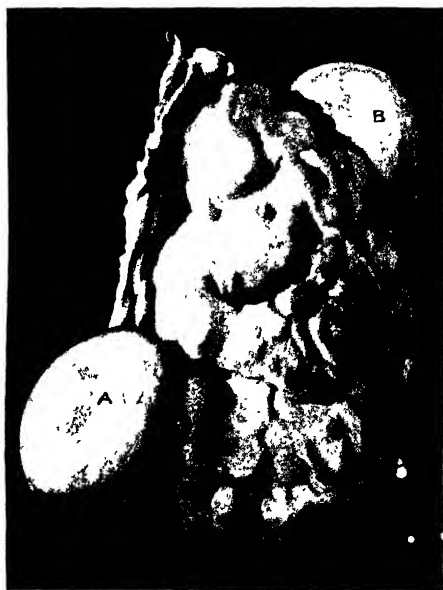


FIG. 166.—Carcinoma of ovary secondary to carcinoma of breast. A. and B. Cyst formation. The second ovary, also diseased, is shown in section in Fig. 167.

skin; εἶδος, a likeness) cyst is characterised by possessing a lining of cells, derived from ectodermal cells, and by containing a heterogeneous collection of other ectodermal structures, as hair, teeth, sebaceous glands, and nails, and, in addition, traces or even large quantities of tissues resembling almost any of the structures of the body (v. Fig. 169). Among these may be mentioned cartilage, bone, mucous and mammary glands, and smooth muscle-fibre. Their fluid contents are composed of a yellow and greasy substance containing sebaceous matter, shed epithelium, and fat. The fluid solidifies as the tumour loses its heat after removal. Dermoids are usually of comparatively small size, and rarely exceed that of a foetal head. They are usually unilateral, but may be bilateral.

Several theories have been brought forward to explain the origin of dermoid cysts :—

(1) That they are due to the inclusion of a portion of ectoderm in the ovary, at a time at which the latter lies close to the former. This theory, while it serves to account for the presence of ectodermal structures in these tumours, does not in the least account for the presence of the various structures which are not ectodermal in

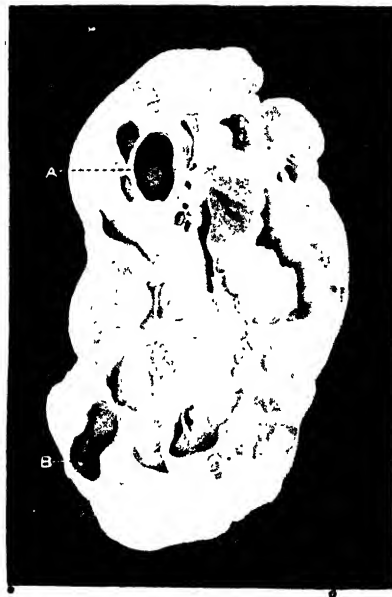


FIG. 167.—Carcinoma of ovary, secondary to carcinoma of breast. A. and B. Cyst formation. The second ovary, also diseased, is shown in Fig. 166.

(2) That they are instances of parthenogenesis (ovular development without impregnation), that is to say, that an ovule takes on growth *per se* and develops an atypical incomplete embryo, in which many of the ordinary tissues of the body are represented, whilst others are not, such tissues being arranged in no recognised order but grouping themselves haphazard.

(3) That a dermoid is derived from a cell called a "nodal cell," which has been lying latent up to the time of the formation of the tumour. Bard, who was the originator of this theory, applies the term "nodal cell" to the cells of the ovule prior to the differentiation of the three layers of the embryo. As these layers are derived from "nodal cells," each cell must apparently have the power of developing different tissues. Such a theory would also explain those cases in

which dermoids, containing tissues other than ectodermal, have been found in parts of the body other than the ovary.

A teratoma is a solid tumour which contains elements very similar to those met with in a dermoid cyst, but these elements are more irregularly arranged and are distinctly malignant in type. Dermoid cysts constitute about sixteen per cent. of all large ovarian tumours, whilst teratomata are rare.

V. COMPLEX TUMOURS.—Complex or mixed tumours are formed by the association of different varieties of tumour in the same growth, as by the association of a proliferating tumour and a fibroma.

Pathological Anatomy.—Tumours of the ovary tend to grow in one of two directions, either into the peritoneal cavity or between the layers of the broad ligament. Growth into the peritoneal cavity is

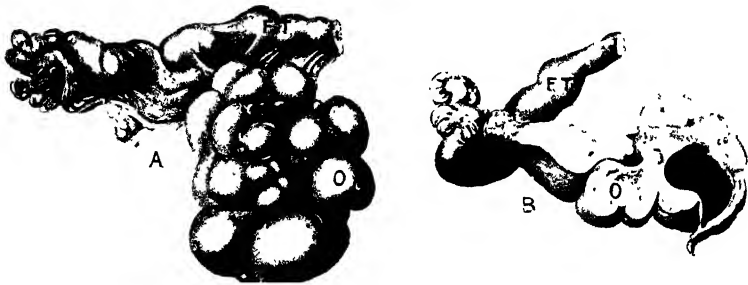


FIG. 168.—Endothelioma of the ovaries. A. Right ovary. B. Left ovary seen in section. F.T. Fallopian tube. O. Ovary.

much the more common, and in such cases, as the tumour enlarges, it draws out the broad ligament into a regular pedicle, by means of which it is moored to the pelvic floor. As the broad ligament stretches, the tube also is elongated, and may become two or three times its normal length. The blood supply to the tumour is derived partly from the ovarian artery coming through the infundibulo-pelvic ligament, and partly from the anastomosing branch from the uterine artery coming through the ovarian ligament.

Growths between the layers of the broad ligament usually result in the formation of what is known as an intra-ligamentous cyst, but in some cases the tumour may burrow so deeply behind the pelvic peritoneum that its original relation to the broad ligament is apparently lost. In such cases the tumour may burrow extra-peritoneally until it comes into relation with the ureters, and with the mesenteries of the ascending and descending colon and the rectum. During its growth it receives additional blood supply from the surrounding tissues.

Symptoms.— The principal symptoms caused by ovarian tumours are as follows :—

(1) Menstrual disorders. These are very variable. Most frequently, there is slight menorrhagia and metrorrhagia, and dysmenorrhœa; more rarely— in those cases in which the ovarian tissue is completely destroyed—amenorrhœa.

(2) Pressure symptoms. The extent of the pressure symptoms depends both upon the size and the situation of the tumour. Very large tumours cause serious pressure upon the heart, lungs, stomach, and intestines, and so give rise to cardiac palpitations and perhaps failure, dyspnœa, vomiting, and intestinal atony. Smaller tumours,



FIG. 169.—Dermoid cyst of ovary, showing tuft of hair and several teeth. The greasy contents have been removed.

on the other hand, which become impacted in the pelvic cavity, may cause severe pain from pressure upon the sacral nerves, and interference with the functions of the bladder and rectum. In malignant disease of the ovaries, ascites is very commonly present, and, as the tumour grows, secondary involvement of the peritoneum and of the intestines may occur, leading to peritonitis and possibly intestinal obstruction.

(3) Constitutional disturbances. These consist in the occurrence of dyspepsia, debility, insomnia, and other reflex disorders.

There are two changes which may occur in ovarian tumours, and which lead to serious consequences. These are :—

- (1) Twisting of the pedicle.
- (2) Rupture of the cyst wall.

(1) Twisting of the pedicle. Any tumour of the ovary which is not bound down by adhesions, and which has got a definite pedicle, may undergo rotation. The result of such rotation is to cause twisting of the pedicle, and, as the twist tightens, compression of the blood-vessels results, ending, perhaps, in the total cutting off of the blood supply. The tumour then undergoes necrosis, which in turn may be followed by decomposition or suppuration. Sometimes adhesions form between the necrosing tumour and the omentum or the mesentery, and blood-vessels pass to the tumour through the adhesions, with the eventual result that the tumour receives a new blood supply instead

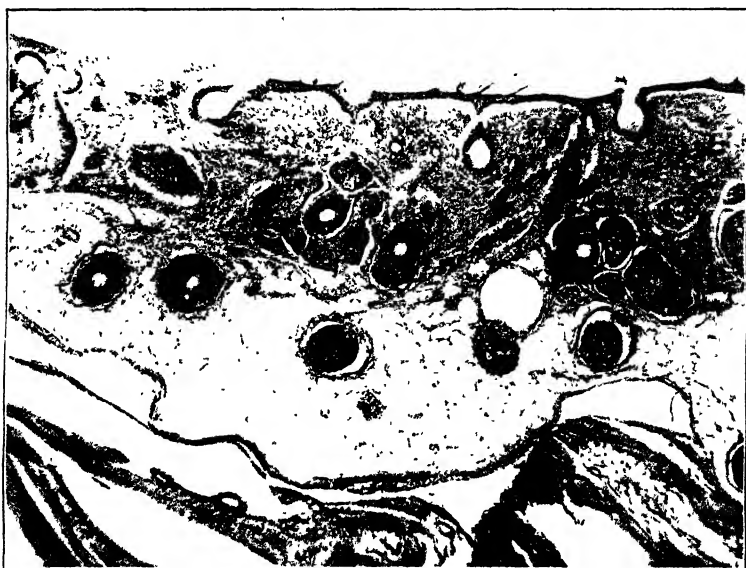


FIG. 170.—Dermoid cyst of ovary, showing skin with roots of hairs and sebaceous glands and underlying fat.

of the normal supply which it has lost, so becoming a "parasitic tumour," as sometimes happens in the case of myomata. The symptoms of the strangulation that results from twisting are generally very marked, and consist in the occurrence of sudden pain in the abdomen with increased rapidity of the pulse rate and perhaps a sudden increase in size of the tumour, which also becomes painful. Sometimes strangulation is accompanied by the rupture of vessels in the tumour walls, with hæmorrhage into the interior of the tumour, in which case the patient will also present the symptoms of an internal hæmorrhage. The later symptoms depend on the extent of the change in the tumour. If the latter becomes necrotic, septic changes may occur in it accompanied by septic peritonitis. If, on the other hand,

a slight blood supply persists, the symptoms of the patient may gradually abate somewhat, but the abdomen will remain tender, and she will suffer considerable pain.

(2) Rupture of the cyst wall. Rupture of the cyst wall may result from direct violence, from gradual thinning of the wall due to impaired nutrition and loss of blood supply, or from erosion of the wall by the extension of a malignant or a papillary growth. If the rupture is sudden, and a large blood-vessel is involved, there will be free hæmorrhage into the peritoneal cavity, with the usual symptoms. If the rupture is gradual, there may be no bleeding, but a slow escape of the cyst contents into the peritoneal cavity. When this occurs in the case of a pseudo-mucinous cystadenoma, the con-

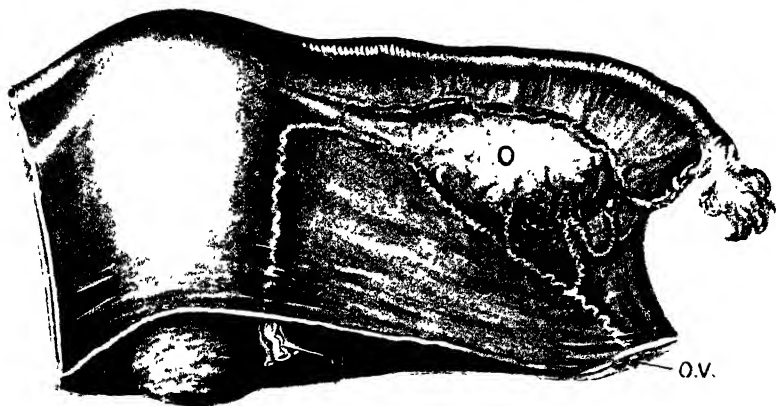


FIG. 171.—Posterior view of the broad ligament, showing the blood supply and the attachments of the ovary. O Ovary. O.V. Ovarian vessels entering through the infundibulo-pelvic ligament. U.V. Uterine vessels.

dition known as pseudo-myxoma of the peritoneum may follow. When gradual rupture occurs in the case of a papillary or malignant tumour, gradual dissemination of the malignant growth through the peritoneal cavity follows. The immediate symptoms of a gradual rupture are probably not marked, but as the secondary changes follow the condition of the patient rapidly becomes worse.

Diagnosis.—A small ovarian tumour must be distinguished from cystic enlargement of the tube and subperitoneal myomata of the uterus. The diagnosis as a rule can be best made by a bimanual examination, unless the tumour is very small, when it can be best made by an abdomino-recto-vaginal examination. The characteristic signs of a small or medium-sized ovarian tumour are as follows:—

- (1) A tumour is felt, distinct from the uterus but connected with it by means of a pedicle, and situated in the neighbourhood of one or other ovary.

- (2) The ovarian ligament runs into the tumour.
- (3) An ovary can be felt on one side, and only the tumour on the other.

In the case of a large tumour which fills the entire abdomen, it is more difficult to arrive at a correct diagnosis. Such a tumour may be confused with a fibro-cystic tumour of the uterus, a pregnant uterus, a collection of ascitic fluid, a large cystic kidney, an enlarged spleen, and an extra uterine pregnancy at or near full term. The diagnosis of a large ovarian tumour can be made by noting the following points :—

(1) The history of the case shows that the tumour has grown upwards from the pelvic brim, and not downwards from the region of the kidney or spleen. Tumours of renal or splenic origin grow downwards.

(2) The outlines of the tumour are distinct, and, if the abdomen is percussed, it will be found to be dull in the centre and resonant round the sides. In ascites, there is no well-marked outline unless the fluid is encysted, and the sides of the abdomen are usually found to be dull while the centre is resonant.

(3) As in the case of a small cyst, the most reliable point is that the tumour is distinct from the uterus, but connected with it by means of a pedicle. The pedicle of an ovarian tumour can usually be felt in the following manner:—Catch the cervix in an American forceps, and insert the middle finger into the rectum and the index finger into the vagina. With the other hand draw the uterus well down within reach, and pass the rectal and vaginal fingers upwards at one or other side of the uterus, in such a manner that they enclose the broad ligament between them. Lastly, get an assistant to push the tumour upwards towards the diaphragm. The fingers will then feel the pedicle tightening—if there is one—and, when the assistant allows the tumour to fall back again, the pedicle will be felt relaxing. The determination of the fact that the tumour is distinct from the uterus will at once exclude the possibility of intra-uterine pregnancy, and will almost exclude the possibility of a fibro-cystic tumour of the uterus.

If it is not possible to palpate the tumour apart from the uterus, even when the examination is made under an anæsthetic, pregnancy and fibro-cystic tumours must be excluded as far as possible by the symptoms of the patient. This as a rule is easy to do in cases of pregnancy, in which the differential diagnosis is most important. In cases of doubt, a definite diagnosis can always be obtained by waiting. Fibro-cysts of the uterus are more difficult to distinguish, but, in their case, an accurate diagnosis is not so important, and doubts can be removed by an exploratory cœliotomy. This remark applies also to cases of extra-uterine gestation after term when the foetus is dead; before term, the symptoms of the case are usually sufficient.

The diagnosis of the actual nature of an ovarian tumour can only

be made after its removal, and though in many cases it may be possible to make such a diagnosis by macroscopical examination, still a certain diagnosis can only be made by routine microscopical examination. Such an examination should therefore be carried out in all cases.

Prognosis.—The prognosis of ovarian tumours, which are not removed, is very bad. Further, at the time of operation it is a wise rule to regard all solid tumours as malignant, unless we are prepared to operate again if the report of the pathologist shows the tumour to be malignant. If the tumour is not removed, death will almost certainly result from one or other of the following causes :—

(1) The pressure which the tumour exerts on vital organs, notably on the heart, causing its failure ; on the intestines, causing obstruction ; on the ureters, causing uræmia ; and on the lungs, causing impeded respiration and œdema.

(2) The toxic effect which the absorption of its contents may have.

(3) Putrefaction or suppuration occurring in the tumour. These changes may occur either with or without twisting of the pedicle.

(4) Rupture of the cyst wall and consequent fatal peritonitis or hæmorrhage, or the dissemination of the contents of the tumour through the peritoneal cavity.

(5) Obstruction of labour, so causing rupture of the uterus.

(6) The occurrence of metastases, if the tumour is malignant, in other organs or in the peritoneum.

(7) The occurrence of malignant change in tumours which were primarily benign.

Papillary cysts of the ovary are, with the exception of actual malignant growths, the most dangerous of ovarian tumours, because, once the papillary masses have burst through their capsule, the rest of the history of the case is similar to that of malignant disease.

Treatment.—All tumours of the ovary must be removed, as it is impossible to determine whether they are of a harmless nature, or not, without doing so. Removal may be effected in the case of small cysts through the vagina, but we do not recommend this route. The abdominal route is always preferable, and in the case of large cysts, it is necessary. In all cases of cystic or solid tumours the entire ovary must be removed, except in the case of retention cysts of the Graafian follicle or cysts of the corpus luteum, and both of these may safely be shelled out of the ovary, leaving the healthy portion of the organ. In the case of papillomatous tumours, of solid tumours, which at the time of operation must be regarded as malignant, and of tumours which are obviously malignant, both ovaries must be removed, even though one may appear to be quite healthy. Experience shows this step to be necessary in consequence of the tendency for malignant disease of the ovary to be bilateral. In such

cases a very complete extirpation of the broad ligament must be carried out, and also of the subjacent tissue and of the glands into which the ovarian lymphatics drain, as is done in Wertheim's hysterectomy. This is a point to which one does not always pay sufficient attention. Many operators also remove the uterus, and there is much to be said in favour of such a practice, partly because the disease may recur in the uterus itself and partly because it ensures a more complete removal of the parametrium and the broad ligament.

Aspiration of the contents of ovarian cysts, as a means of affording temporary relief or even of effecting a cure, is a practice which is not infrequently adopted, although it has been condemned by all modern writers and operators. Aspiration, or tapping, never effects a cure. On the contrary, if the tumour is malignant, it renders dissemination of its contents through the peritoneal cavity more likely. Further, every time a cyst is tapped, adhesions may be formed between the cyst and the abdominal wall; and so a case, which at the beginning may have been uncomplicated, may be rendered most complicated. Tapping of a cyst is only permissible under one condition:—If a patient is dying from cardiac failure due to the pressure of a large cyst, tapping may be resorted to with the object of removing the urgent symptoms and bringing the patient into a condition more suitable for operation. Tapping of the peritoneal cavity may be sometimes necessary, in cases complicated by ascites, in order to facilitate diagnosis.

CHAPTER XIII.

DISEASES OF THE PELVIC PERITONEUM AND OF THE UTERINE LIGAMENTS.

Pseudo-myxoma of the Peritoneum—Pelvic Peritonitis—Pelvic Cellulitis—Tumours of the Broad Ligament, Cysts, Fibroma, Hæmatoma—Tumours of the Round Ligament, Cysts, Fibroma.

PEUDO-MYXOMA OF THE PERITONEUM.

WHEN a cystadenoma of the ovary ruptures, its contents are disseminated through the peritoneal cavity. If the cyst is of the pseudo-mucinous variety, these contents are ropy and gelatinous, and in many cases, especially if there has been a quiet oozing through a thinned wall, adhere to the peritoneum wherever they come in contact with it. In addition, actual groups of cells from the cyst walls may be disseminated, and may take root on the peritoneum, and there continue to pour out the same gelatinous material as formerly they secreted inside the cyst. To this condition the term pseudo-myxoma of the peritoneum is given. It is an extremely rare condition, especially at the present time, when it is usual to operate on ovarian cysts at a comparatively early stage.

Pathological Anatomy.—When the abdomen is opened, the remains of the ovarian cyst which has ruptured are found, and, as a rule, the point at which it has ruptured or yielded can also be found. The entire peritoneum is usually filled with a gelatinous and ropy secretion. The peritoneum is usually thickened, opaque, and covered with gelatinous material. Here and there numbers of small transparent nodules, like boiled sago grains, may be seen or felt, and in places cystic cavities will be found in the subperitoneal tissue. The condition of the peritoneum and the subserous tissue is probably due to attempts to absorb the jelly-like material. Occasionally, true implantation metastases are found, formed, as we have said, from pieces of epithelium which have preserved their vitality, and become attached to the peritoneum, and in such cases the tumour hovers on the brink of malignancy.

Symptoms.—The symptoms are at first those of the ordinary glandular ovarian cyst, but after rupture has occurred they develop more rapidly than before, and the patient's condition becomes

extremely grave. As a rule, the actual rupture causes slight symptoms, as it occurs very gradually.

Prognosis.—The prognosis is very unfavourable. The primary mortality is usually great, even where the tumour and the most part of the gelatinous material can be removed, and recurrences frequently take place. On the other hand, apparent recovery has occurred spontaneously where operation has been abandoned as impossible. In such cases, recovery is presumably due to the gradual atrophy of the secreting cells of the original cyst, and the absorption of the gelatinous secretion by the peritoneum.

Treatment.—The condition may possibly be recognised prior to operation if it is suspected, but in the majority of cases it will probably not be recognised until the abdomen is opened to remove what is regarded as an ordinary ovarian cyst. The peritoneal cavity is then found full of a gelatinous secretion. The only treatment that is at all satisfactory is the immediate removal of the tumour if it is possible to do so, and of all the gelatinous secretion, or of as much of it as can be removed.

PELVIC PERITONITIS.

Pelvic peritonitis is the term applied to inflammation of the pelvic peritoneum. It is also known as perimetritis, when the inflammation affects the peritoneum covering the uterus or the broad ligaments.

Etiology.—Pelvic peritonitis is always present in association with salpingo-oöphoritis, as a result of the extension of the tubal infection to the peritoneum. In other cases the source of infection may be the intestinal canal, or perforating wounds of the uterus or vagina, or, possibly, any part of the pelvic connective tissue, the extension taking place by means of the lymphatics.

Pathological Anatomy.—As a consequence of infection, an exudate of lymph is poured out on the surface of the peritoneum, and adhesions form in all directions between opposing surfaces. As a result, the intestines become adherent to one another, to the uterus, and to the appendages; while the uterus and appendages become glued together and to the peritoneum of Douglas' pouch. If the infection is acute, pus may form, and, collecting in the interspaces between the adhesions, may lead to accumulations of very considerable size. Such accumulations may burst either externally, or into the vagina, uterus, bladder, rectum, or intestines. As the inflammation subsides, the adhesions contract and become firmer, and in this way fixed malpositions of the uterus and fixed ovaries are produced.

Bacteriology.—The micro-organisms which are commonly found in pelvic peritonitis are the *gonococcus*, *streptococcus pyogenes*,

staphylococcus pyogenes aureus and *albus*, and the *bacillus coli communis*.

Symptoms.—The symptoms caused by acute and localised pelvic peritonitis are almost the same as those caused by acute salpingo-

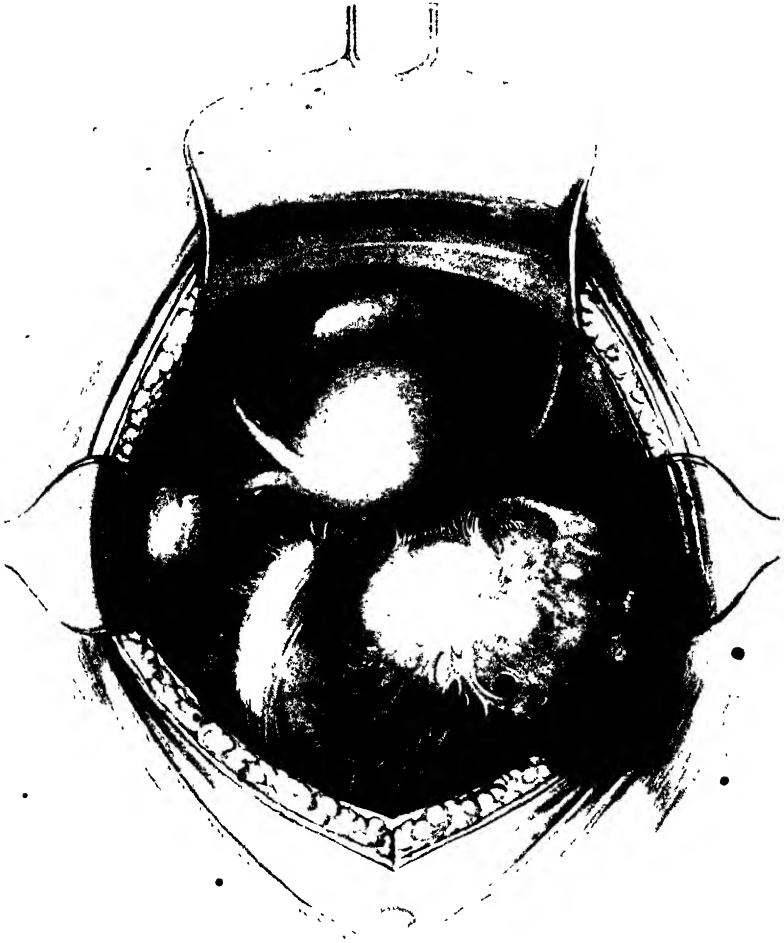


FIG. 172.—Pelvic peritonitis the result of a double pyosalpinx.

oöphoritis. The symptoms of the chronic stage are due to displacements and pressure caused by the contraction of the adhesions. Thus, there may be the symptoms of chronic metritis, from the displacement of the uterus; irritability of the bladder, from the traction exerted upon that organ by contracting bands; sterility from occlusion of the abdominal ostia of the tubes; flatulence, and a greater or less degree of obstruction of the intestines, from constricting

bands; and ovarian tenderness, or pain, from pressure on the ovaries.

Prognosis.—The prognosis of pelvic peritonitis in its acute stage is somewhat serious, on account of the risk of the infection extending to the general peritoneal cavity. Even after the acute stage has passed away, there may be a recurrence at any time. In the chronic stage, pelvic peritonitis does not as a rule endanger life, except in rare cases by causing intestinal obstruction. The patient, however, seldom completely recovers from an attack, as the adhesions and their effects persist, causing a varying degree of discomfort or pain.

Treatment.—The treatment of acute pelvic peritonitis consists in keeping the patient at rest in bed, adopting measures to relieve the pain, and promoting the peristalsis of the intestines. The pain may be best relieved by the application of hot stupes over the hypogastrium, or sometimes of an ice-bag, by warm vaginal douches, and by the insertion in the vagina of glycerine and ichthyol plugs. Leeches and dry-cupping over the lower portion of the abdomen are also recommended. If accumulations of pus form in Douglas' pouch or among the intestines, they must be opened, if possible through the vagina. If this cannot be done, and if it is necessary to open the abscess from above, sufficient time must be allowed to permit of the formation of adhesions between its sac and the abdominal walls in order that it may be possible to open the sac without at the same time opening the general peritoneal cavity. Vaccine treatment may be indicated if the nature of the infecting organism can be ascertained.

As a rule, it is advisable to begin in chronic pelvic peritonitis with palliative treatment, and relief may be afforded to the symptoms by the same measures as give relief in salpingo-oöphoritis. If this fails to relieve the pain, and if a year has elapsed since the acute stage, it is advisable to open the abdominal cavity with a view to making an exact diagnosis. The radical treatment of this stage consists in the removal of the cause of the peritonitis, such as inflamed ovaries or tubes, suppurating tumours, etc., in the breaking down of adhesions with a view to correcting the malpositions which they cause, and in the ventral suspension or fixation of the uterus.

PELVIC CELLULITIS.

Pelvic cellulitis is the term applied to inflammation of the subperitoneal pelvic tissue due to infection, either directly, or from an already infected area through the lymphatics. When it is limited to the subperitoneal tissue in the neighbourhood of the uterus or broad ligaments, it is sometimes termed parametritis. It is most

usually secondary to septic or gonorrhœal endometritis, especially when such a condition starts after parturition. It also occurs from injuries, such as deep lacerations of the cervix and wounds of the vaginal vault, through which infection can reach the pelvic connective tissue.

Pathological Anatomy.—Two forms of pelvic cellulitis may occur :—a diffuse form, in which the infection extends rapidly through the entire pelvic connective tissue ; and a circumscribed form, in which the infection remains limited to one portion of the connective tissue. In the former case the infection is usually more virulent, the entire pelvic tissue becomes infiltrated by an exudate of small leucocytes and sero-purulent fluid, and, as this exudate increases in amount, the uterus becomes so fixed that it seems to be embedded in plaster of Paris. In the circumscribed form, the exudate is limited to one or other side of, or in front of or behind, the uterus, and, according to its situation, is spoken of as anterior, posterior, or lateral parametritis. In each form, the exudate may follow one of two courses :—it may be absorbed, or suppuration may take place. In those cases in which absorption occurs, a certain degree of infiltration and of cicatricial contraction of the uterine ligaments persists, leading to subsequent displacements of the uterus (*v.* Fig. 62). If an abscess forms, it tends to point most frequently above Poupart's ligament. On the other hand, it may point through the ischial foramen, at the outer margin of the quadratus lumborum, below Poupart's ligament, or into the vagina, bladder, or rectum (Dührssen).

Symptoms.—The symptoms are very similar to those of the acute stage of pelvic peritonitis. If, as sometimes happens, the sheath of the ilio-psoas muscle is involved, the patient when in bed will lie with the thigh on the affected side flexed, in order to relax the muscle as far as possible. If pus forms, the temperature becomes hectic in character, and night sweats and rigors occur. In the chronic stage, the symptoms are due to the displacements which are brought about by the cicatricial contraction of the ligaments.

Diagnosis.—The diagnosis is made from the symptoms, in conjunction with the results of a pelvic examination. The uterus is found to be surrounded by a firm immovable mass, or else to be displaced to one or other side by such a mass. If the exudate is situated in the tissue at the base of the broad ligament, the vagina seems to be roofed over by the exudate. If the exudate is principally in the layers of the broad ligament, a hard mass can be felt by abdominal palpation on one or other side of the uterus. A unilateral cellulitis, especially if situated in the layers of the broad ligament, is very likely to be mistaken for a suppurating hæmatoma, if one relies on the physical signs alone. The diagnosis is made from the history.

Prognosis.—A diffuse cellulitis may kill the patient by setting up a general septic poisoning—such a termination is, however, rare, or, if an abscess forms, by bursting into the peritoneal cavity. Sometimes the exudate may be absorbed, and leave behind no very palpable trace of its existence. More generally, however, there will be some displacement of the uterus caused by cicatricial contraction of the ligaments.

Treatment.—The treatment of pelvic cellulitis resembles the treatment of the other acute inflammations of the pelvis—rest in bed, hot stupes, hot vaginal douches, the use of opiates if necessary, and the administration of easily digested and nourishing food, stimulants,

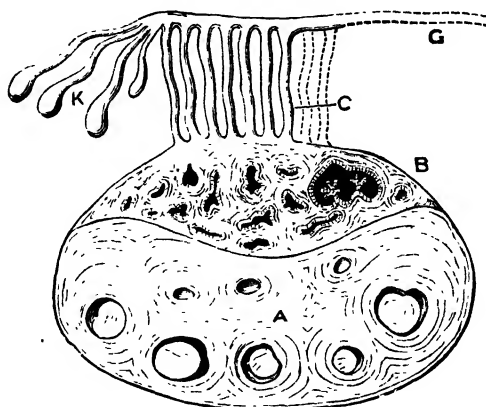


FIG. 143.—Diagram of the ovary and parovarium showing the relationships of the oöphoron and par-oöphoron. A. Oöphoron. B. Par-oöphoron. C. Vertical tubules of parovarium. K. Kobelt's tubes. G. Gärtner's duct. (Bland-Sutton.)

and laxatives. If an abscess forms, it will tend to point in one of the places already mentioned. If possible, that is, if the abscess is situated in the base of the broad ligament, or beneath the peritoneum of Douglas' pouch, it must be opened from the vagina. If it is bulging upwards into the abdomen, and tending to point above, its sac must be allowed to become adherent to the abdominal walls before opening it. After the contents have escaped, it is advisable to make a counter-opening into Douglas' pouch from the vagina in order to allow free drainage.

* TUMOURS OF THE BROAD LIGAMENT. *

CYSTS.—Cysts of the broad ligament arise in the parovarium (*παρά*, beside; *ovarium*, an egg-keeper) or organ of Rosenmüller, which is the remains of the Wolffian body. The parovarium consists of three sets of tubules:—an outer set, about three in number, running

vertically to the outer extremity of the broad ligament and sometimes ending in small pedunculated cysts (the hydatids of Morgagni)—these are known as Kobelt's tubes; an inner set of about twelve in number, also running vertically and radiating from the par-oöphoron; and, lastly, a larger tube running from Kobelt's tubes horizontally across the top of the second set, and ending sometimes blindly in the broad ligament, at other times in the vaginal wall. The last is known as Gärtner's duct, and is the representative in the female of the vas deferens in the male (*v.* Fig. 173).

Pathological Anatomy.—The small pedunculated cysts developing in Kobelt's tubes are of no clinical importance. The sessile cysts

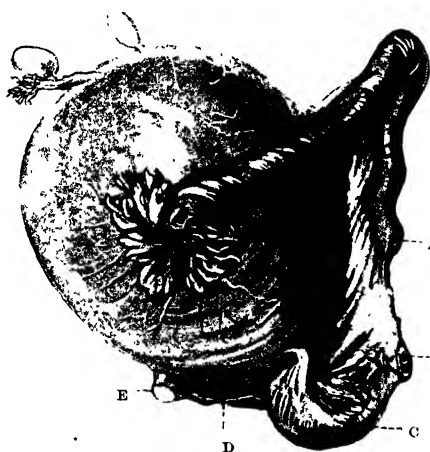


FIG. 174.—A parovarian cyst. A. Cut end of tube. B. Ovarian ligament. C. Ovary; D. Ovarian artery. E. Infundibulo-pelvic ligament. F. Accessory fimbriated end of tube with hydatid of Morgagni.

which grow between the layers of the broad ligament are usually comparatively thin-walled structures, covered by peritoneum, lined with columnar epithelium—if it has not disappeared as the result of pressure atrophy—and almost always unilocular (*v.* Fig. 174). In a few instances, they become papillomatous, and in these cases they are believed to arise in Gärtner's duct. Parovarian cysts, which are not papillomatous, can be distinguished from ovarian cysts in the following manner:—

- (1) They are completely covered by peritoneum which can be easily stripped off.
- (2) They are almost always unilocular, and very thin-walled.
- (3) The contents are clear and slightly alkaline, and contain a substance which is precipitated by the addition of alcohol. They are of low specific gravity—1004 to 1006.

- (4) The Fallopian tube is stretched over the cyst in intimate connection with it.
- (5) The ovary will usually be found at the back of the cyst and distinct from it.

Cysts developing in the terminal portion of Gärtner's duct burrow deeply into the pelvic cavity, and may even bulge into the vagina (*v.* Fig. 26).

Symptoms and Treatment.—The symptoms of these cysts are practically the same as those of ovarian cysts. The treatment is also the same, because, although small parovarian cysts are not of any great consequence, it is not possible to make a differential diagnosis between them and ovarian cysts prior to their removal. In removing them, it is seldom necessary to remove the ovary also, and they can usually be easily enucleated after incising and separating their peritoneal capsule. Cysts of Gärtner's duct, which burrow deeply, may in some cases be easily removed through the vagina.

FIBRO-MYOMA.—Fibro-myomata of the broad ligament, quite distinct from fibro-myomata of the uterus, are occasionally met with. Some writers believe that they begin in the uterus and then become detached: but it is more generally believed that they arise, independently of the uterus, in the muscle fibres which are prolonged into the base of the broad ligament. They manifest their presence by the pressure symptoms to which they give rise. Removal is sometimes difficult, on account of their close relation to the large pelvic blood-vessels and the ureter.

HÆMATOMA.—Hæmatoma of the broad ligament will be discussed under the head of Internal Hæmorrhage.

TUMOURS OF THE ROUND LIGAMENT.

CYSTS.—Cysts of the round ligament, formed by accumulations of serous fluid beneath the peritoneal covering which accompanies the round ligament into the inguinal canal, have been already described under the name of hydrocele of the canal of Nuck.

FIBROMA.—Fibromata and fibro-myomata of the round ligament are sometimes met with. They may reach the size of a fetal head or a little larger; they grow either into the abdominal cavity or externally, according as they are situated above or below the internal abdominal ring.

Those which grow into the abdominal cavity must be distinguished from ovarian tumours and pedunculated uterine myomata. These tumours should be removed if they reach any considerable size, on

account of the danger of their undergoing sarcomatous change. If they are growing externally, they can be easily enucleated; if growing internally, they must be removed by an abdominal cœliotomy.

OPERATION.

The following operation may be described here:—

VAGINAL INCISION AND DRAINAGE.

Vaginal incision and drainage is of value in order to evacuate collections of pus in the pelvis, and to afford drainage from the most dependent part of the peritoneal cavity in septic peritonitis.

Indications.—Vaginal incision is indicated in the following cases:—

- (1) Localised collections of pus in Douglas' pouch or between the layers of the broad ligament.
- (2) Cases of pyosalpinx or ovarian abscess in which the diseased appendages cannot be removed, either owing to adhesions or to the inability of the patient to undergo a serious operation. It is also indicated in acute infection as a preliminary to the removal of the appendages, with the object of lessening the risk of infection of the peritoneal cavity.
- (3) General septic peritonitis.

Instruments.—The following instruments are required:—A scalpel, or a pair of long-handled scissors with sharp points; Bozemann's catheter; a posterior speculum; two curved clamp forceps; two American forceps; six clip forceps; and a long-handled plugging forceps.

Operation.—Begin by examining the patient carefully, especially by the rectum, in order to determine the relation between the abscess, the rectum, and the posterior vaginal fornix. Then expose the last, by passing a posterior speculum. If the cervix is low down and fairly movable, catch the posterior lip with an American forceps, and, by drawing the forceps downwards and forwards, place the mucous membrane of the fornix upon the stretch. A transverse incision is next made with the scalpel through the mucous membrane of the posterior fornix just behind the junction of the cervix and the vagina, and about an inch in length (v. Fig. 242). In most cases, it will then be possible to push the finger through the wall of the abscess, and so make a passage for the pus. If this cannot be done, a curved clamp forceps may be introduced instead of the finger, and the opening enlarged by drawing the forceps out with its blades apart. Then, with one finger in the cavity, make a careful bimanual examination

with the object of ascertaining the relation of the abscess to the pelvic viscera, and the existence of secondary pus-containing loculi. All these loculi must be carefully broken down with the finger, but every precaution must be taken not to break through the adhesions which limit the infection above. The cavity is then well washed out with an antiseptic lotion, and the best of these is, we think, peroxide of hydrogen. This may be made by diluting the ordinary full strength solution with an equal quantity or with three parts of water, so as to make a fifty per cent. or a twenty-five per cent. solution. If this lotion is used, the douching should be continued until the evolution of gas has almost ceased. The cavity is then plugged tightly with iodoform gauze (v. Fig. 225). Usually, there is tolerably free hæmorrhage, but this will stop when a vaginal plug is applied in addition to the plug in the cavity, and is supplemented by a firm compress and abdominal binder.

Complications.—The principal complication which may occur is the wounding of the rectal wall while the incision is being made. If the opening is made too much to one side, there is a risk of wounding the ureter or uterine vessels.

After-treatment.—The patient should be kept as much as possible in a semi-recumbent or sitting position almost from the time that she comes out of the anæsthetic. The gauze plug should be removed the next day, the cavity douched, and a fresh plug inserted. This treatment is continued, and in a few days the size of the cavity will have become so much lessened that it will be possible to dispense with the plug in the cavity, and only necessary to place some gauze in the vaginal opening in order to keep the latter patent.

CHAPTER XIV.

INJURIES RESULTING FROM PREGNANCY AND LABOUR.

Pendulous Abdomen: Injuries which favour Prolapse—Symptoms—Diagnosis—Treatment. Operations: Colpo-perinaeorrhaphy—Anterior Colporrhaphy. Injuries which cause Fistulae—Varicose—Ætiology—Symptoms—Diagnosis—Treatment.

INJURIES RESULTING FROM PREGNANCY.

THE only injury which is likely to occur as a direct result of pregnancy is the overstretching of the anterior abdominal wall, resulting in a condition to which the term "pendulous abdomen" is applied. If a woman has had a number of pregnancies at short intervals, if the size of the uterus in each of them is above normal, either due to the size of the child or to the amount of liquor amnii, and if the abdominal muscles are not supported during the pregnancy, they tend to become weakened and overstretched by the constant strain, and subsequently do not return to their normal condition. When such a patient is examined a year or so after the last pregnancy, we find the following changes:—The abdominal skin is redundant and wrinkled; and the recti muscles are widely separated, and only held together by a layer of very thin fascia. If the patient when lying on her back strains sufficiently to increase the intra-abdominal tension, the intestines force this distended fascia upwards in a boat-shaped tumour between the edges of the separated muscles. When the patient walks about, the abdomen drops forward, and, according to the degree of the distension of the intestines, projects to a greater or less extent. The consequences of the condition are of importance, and are prejudicial to the general health of the patient. In the first place, the over-distension of the abdomen and its pendulous nature tend to cause difficulty in walking, and to hamper all movements of the patient which are dependent on normal abdominal muscles. In the next place, the intra-abdominal pressure is greatly reduced, with the result that the intestines lose a certain amount of support, and tend to undergo undue dilatation from the presence of gas. This process eventually may go on to such an extent as to lead to actual atony of the intestinal walls, impairing their normal functions of absorption and excretion. Lastly, there is a loss of support for the larger organs of the abdomen, particularly the liver, and a general ptosis of the abdominal contents may occur.

Diagnosis.—The diagnosis of undue distension of the abdominal walls is easily made by direct inspection of the patient, and by palpation. If the patient while lying on her back is made to strain, the projection of the intestines between the separated muscles is very obvious, as also is her condition when she stands upright. The amount of separation of the muscles can also easily be estimated.

Treatment.—The treatment of pendulous abdomen in so far as the obstetrician is concerned is prophylactic, that is to say, his efforts should be directed to the proper support of the abdominal walls during pregnancy. It is advisable that every woman should wear a properly fitting abdominal belt during the latter half of pregnancy, and it is imperative that she should do so if there is any previous yielding of the abdominal wall or tendency to pendulous abdomen during pregnancy, or if the size of the ovum is greater than normal.

The treatment of pendulous abdomen after it has occurred may be palliative or radical. Palliative treatment consists in the wearing of a suitable abdominal belt, and is usually sufficient in all slight cases, or even in cases that are fairly marked, if the patient can get a belt which fits without discomfort. Where the degree of protrusion is great, or where a belt does not prove satisfactory, we have devised a form of operation from which we have had good results. It consists of three steps. The first step is the excision of any redundant skin. The second step is the opening of the stretched fascia in the middle line, and the over-lapping of the two layers of fascia to a sufficient extent to bring the recti muscles again into contact. The third step is the suture of the fascia in this position and the closure of the incision in the abdominal skin. The value of the result obtained is shown by the fact that the re-constituted abdominal wall is capable of standing the distension of subsequent pregnancy without yielding.

INJURIES RESULTING FROM LABOUR.

Injuries of the genital tract, occurring during labour, are extremely common accidents. They can be divided into:—

- I. Injuries which tend to produce or to favour prolapse of the vaginal walls or uterus.
- II. Injuries which tend to produce fistulous communications between the genital tract and the neighbouring organs.

INJURIES WHICH TEND TO PRODUCE OR TO FAVOUR PROLAPSE OF THE VAGINAL WALLS OR UTERUS.—The injuries which tend to produce or to favour prolapse of the vaginal walls or uterus are

lacerations of the perinæum, recto-vaginal septum, and cervix. The first two are the most important; the last only tend to favour the occurrence of uterine prolapse by setting up metritis, and so increasing the size of the uterus.

Slight lacerations of the perinæum are of little or no importance, except at the time of their occurrence. On the other hand, lacerations



FIG. 175.—Complete prolapse of the uterus and inversion of the vagina. Note the type ulceration of the cervix, the result of friction against the skin of the thighs. (From a photograph by Dr. Arthur Ball.)

of either the vaginal wall or perinæum which involve the levator ani muscle are of the greatest importance, owing to the further pathological conditions which they tend to bring about.

We have already described the part played by lacerations of the levator ani muscle in producing prolapse of the uterus, and we have shown how the first step is prolapse of the anterior vaginal wall as a result of lack of support from the posterior wall.

Such a prolapse is termed a cystocele (*κύστις*, a bladder; *κήλη*, a tumour), and, as it grows, it drags upon the uterus in the region of the cervico-vaginal junction, with the result that the posterior ligaments of the uterus and the supra-vaginal portion of the cervix are lengthened. If, in association with this condition of the vagina, the uterus becomes retroverted owing to the relaxation of the posterior

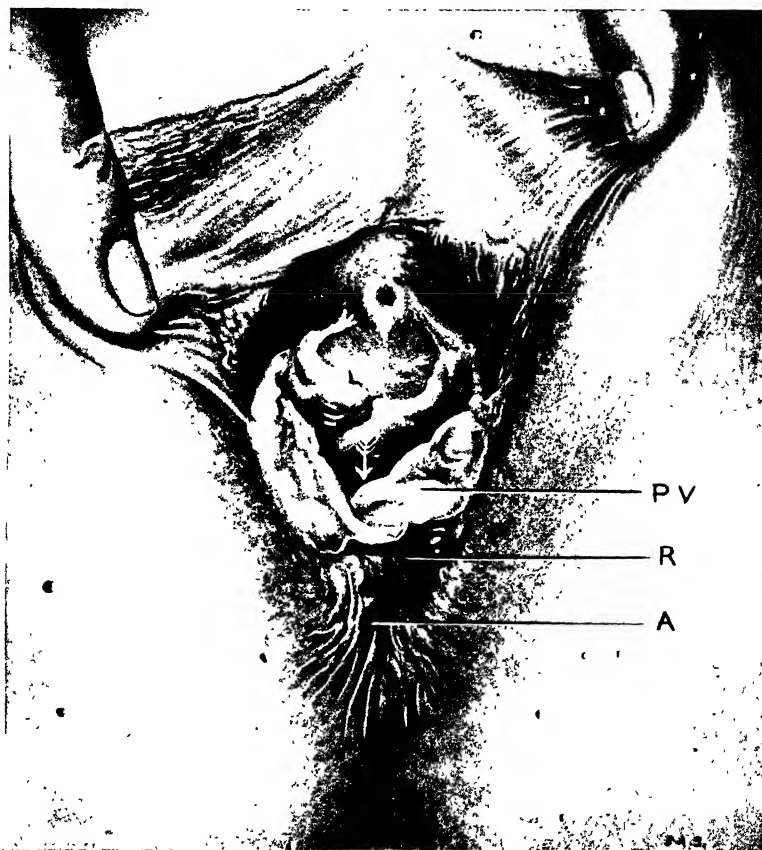


FIG. 176.—Complete laceration of the perinaeum. P.V. Posterior vaginal wall. R. Rectum. A. Remains of anus. The arrow points into the vagina.

ligaments and the downward drag of the vagina, and so comes to lie with its axis more or less coinciding with the axis of the vagina, any increase in the intra-abdominal pressure will tend to drive it downwards into the vagina. As the uterus descends it drags down the posterior vaginal wall after it, and forms what is known as a rectocele (*rectum*, the rectum, *κήλη*), although there is usually no corresponding displacement of the rectal wall (v. Fig. 46).

Symptoms.—The symptoms, which lacerations cause, depend upon their situation, their degree, and upon the amount of inflammation which accompanies them.

Perinæal lacerations, if complete, that is if through the sphincter ani and rectal wall, cause incontinence of fæces. If incomplete, they

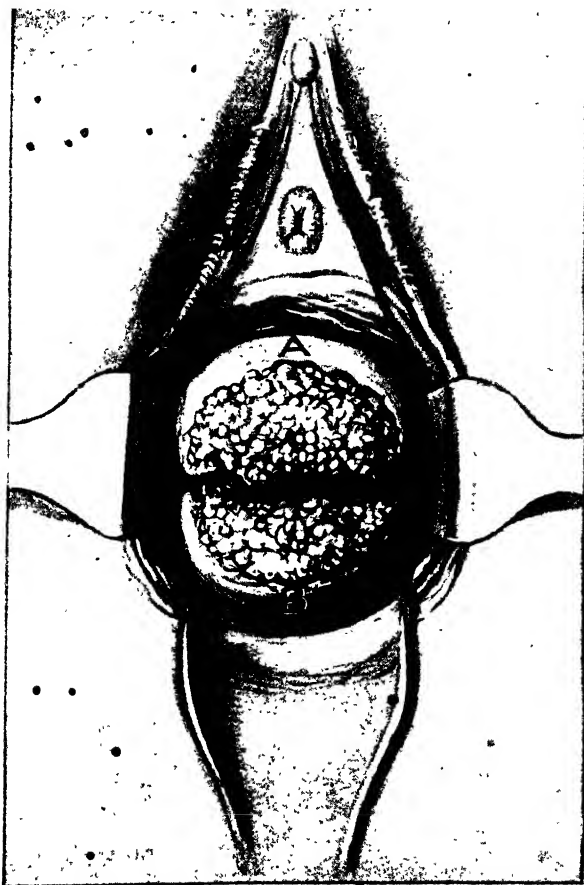


FIG. 177.—Extensive ectropion of the cervix, the result of bilateral laceration. If the points A and B on the anterior and posterior lips respectively were brought together, the ectropion would disappear.

tend to cause gaping of the vagina, a condition which favours the occurrence of vaginitis and the various symptoms by which that complaint is accompanied. If the levator ani muscle is torn and there is a prolapse of the vaginal walls, there will also be vaginitis, and probably difficulty in defæcation and micturition. If the uterus descends, there will be in addition the various symptoms of prolapse or procidentia.

Cervical lacerations cause *ectropion*, i.e., eversion of the mucous membrane of the cervical canal, a condition which is liable to be confused with the so-called *erosion* (v. Figs. 82 and 86). An *ectropion* may cause endocervicitis, and this in turn tends to set up endometritis with its train of symptoms.

Diagnosis.—The diagnosis of these cases can be made by inspection. A vaginal cyst may sometimes simulate a cystocele. A myoma growing from the cervix may possibly be mistaken for a prolapsed uterus. The condition of the levator ani muscle can be determined by palpating the posterior vaginal walls at each side of the middle line. If the muscle is torn, a sulcus can be distinctly felt with the fingers between the lower edge of the muscle and the perineum, and, moreover, the absence of the free edge of the muscle from the place at which it is normally in contact with the lateral vaginal walls will be readily noticed.

Treatment.—We have already discussed the treatment of uterine prolapse, and here we shall only deal with the treatment of the different injuries with which prolapse is usually associated. Perineal lacerations should always be sutured at the time they occur. If this was regularly and carefully done, prolapse of the uterus would be by no means so frequent as it is. Perineal lacerations cannot always be prevented; they can, however, in almost all cases, be remedied by suturing them immediately after their occurrence, and the obstetrician who neglects to do so does not consult the interests of his patient.

In chronic perineal laceration, repair is also indicated, particular care being paid to the suture of the levator ani muscle. The operation known as colpo-perineorrhaphy is the most suitable.

If the perineal tear is accompanied by a cystocele, an anterior colporrhaphy should also be performed.

In lacerations of the cervix, our treatment may be palliative or radical. Palliative treatment is directed to the cure of the endocervicitis which frequently accompanies lacerations, also to the destruction of the cervical glands whose mouths have been everted into the vagina as a result of the tear. It is carried out by curetting the endometrium and endocervix, and also by swabbing out the latter with strong caustics, as nitrate of silver, carbolic acid, or nitric acid. The application of caustics is made once or twice in the week, and the treatment must as a rule be continued for several months. Owing to the length of time which is usually required in order to effect a cure by these means, radical treatment is always preferable when the condition is sufficiently marked to give rise to symptoms. It consists either in the amputation of the diseased portion of the cervix, or in the suture of the tear.

The operations of colpo-perinæorrhaphy and anterior colporrhaphy will be described here, while operations on the cervix will be described later.

PERINÆORRHAPHY AND COLPO-PERINÆORRHAPHY.

By the term perinæorrhaphy (περίαιον, the surrounding district; ραφή, a seam) is meant the suturing of a ruptured perinæum with the object of restoring it to its original condition.

By the term colpo-perinæorrhaphy (κόλπος, the vagina; περίαιον; ραφή) is meant the narrowing of the vagina by the removal of a portion of the mucous membrane of the posterior vaginal wall, and at the same time the re-forming of the perinæum.

Indications.—Immediate perinæorrhaphy is indicated in all cases in which the so-called inevitable laceration of labour, involving the posterior fourchette, passes that limit and invades the perinæum proper.

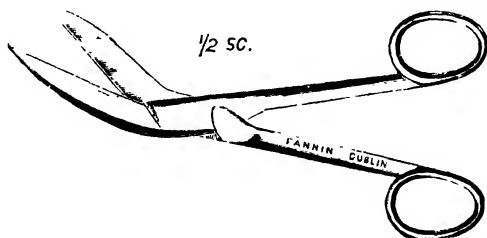


FIG. 178.—Lawson Tait's perinæorrhaphy scissors.

Perinæorrhaphy for chronic laceration is indicated under the following conditions:—

- (1) If the laceration extends into the rectum, that is, if it is "complete."
- (2) If the laceration tends to cause gaping of the vulva, or to favour prolapse of the vaginal walls or uterus.

Colpo-perinæorrhaphy is indicated instead of perinæorrhaphy when the mucous membrane of the posterior vaginal wall is so redundant as to necessitate the removal of a part of it. This is the condition found in almost every case, and so we usually prefer colpo-perinæorrhaphy to simple perinæorrhaphy.

Instruments.—A pair of sharp-pointed scissors with the blades inclined laterally at an angle of a right angle and a half to the handles (v. Fig. 178); three or four pairs of American forceps; two or three clip forceps; large and medium whole-curved needles; a needle-holder; silk-worm-gut and catgut sutures; and a toothed dissecting forceps.

Operations.—The operations for the repair of the perinæum, either with or without an accompanying rectocele, fall into two groups according as the perinæal laceration is incomplete or complete.

I. Incomplete colpo-perinæorrhaphy.

II. Complete colpo-perinæorrhaphy.

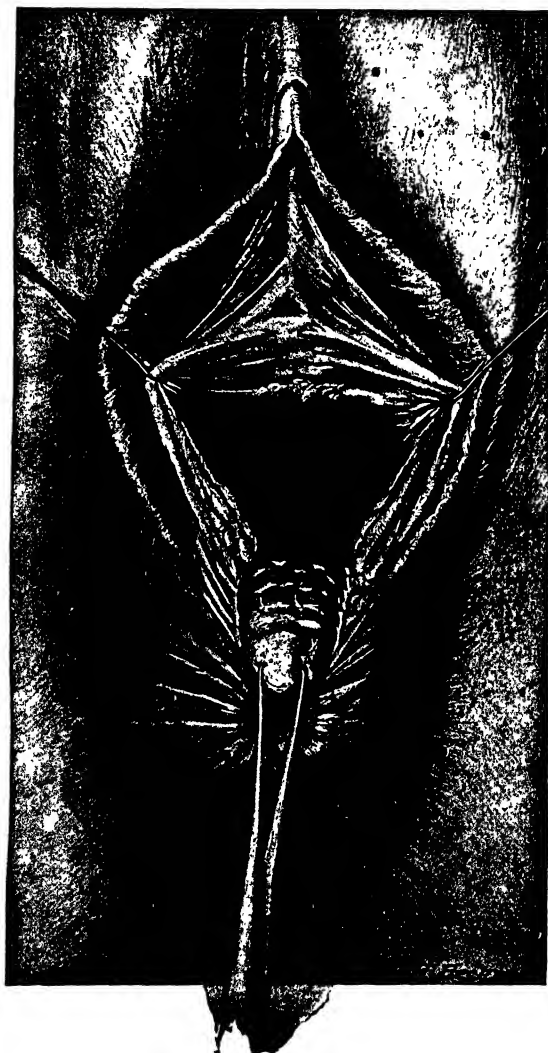


FIG 179.—Chronic incomplete laceration of the perinæum. (Kelly.)

I. INCOMPLETE COLPO-PERINÆORRHAPHY.—This operation is carried out as follows:—The extent of the perinæal tear is carefully determined, and its anterior edges are marked out by bullet forceps as shown (v. Fig. 180). A third bullet forceps is applied to the perinæal

skin just behind the posterior edge of the tear. The position of the separated edges of the levatores ani muscles is determined by palpation through the mucous membrane of the vagina. An incision is then made from side to side along the line of junction of the skin and the

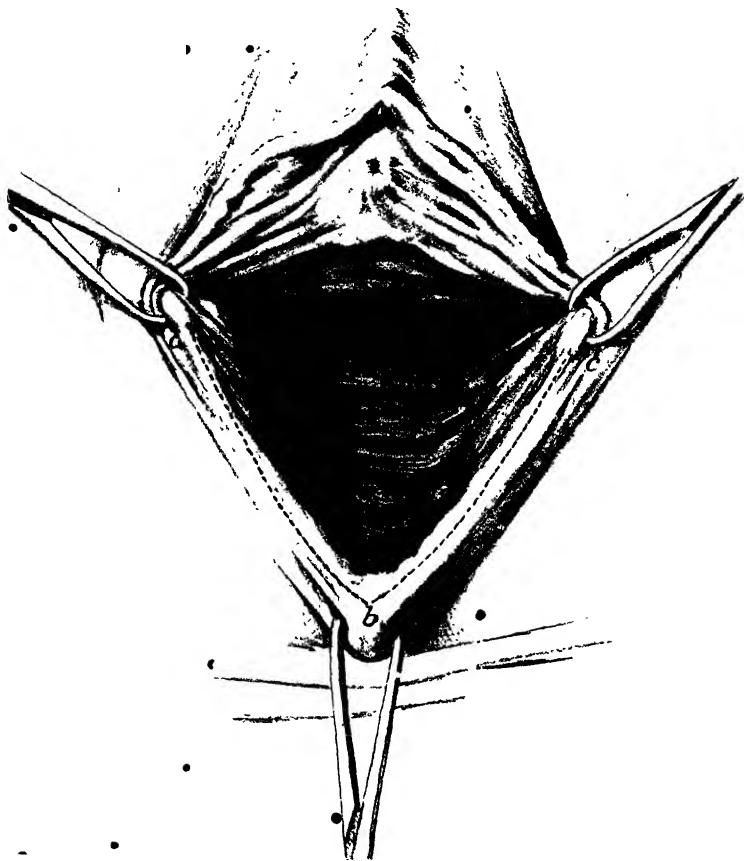


FIG. 180.—Incomplete perinæorrhaphy. *a, b, c.* The line of incision at the junction of the skin and the mucous membrane.

vaginal mucous membrane (*v.* Fig. 180). This incision cuts through the skin and any underlying scar tissue. A flap of vaginal wall is then dissected up off the underlying rectum (*v.* Fig. 181). At its lowest part it is firmly bound to the rectum and the sphincter ani by fibrous bands, the result of the old cicatricial healing. As soon, however, as these have been cut through, the separation

of the remainder of the flap by blunt dissection is easy. The best method of dividing these bands with the scissors so as to avoid injuring the rectal wall is shown in Fig. 181. When the



FIG. 181.—Incomplete perinæorrhaphy. The method of separating the vaginal flap from the rectum. R. Rectum.

dissection of the flap is complete, a triangular space is exposed, which is bounded laterally by the remains of the superficial vaginal and perinæal muscles, and at a deeper level by the pubo-coccygeal fibres of the levatores ani muscles, while its floor is formed by the

rectum. It is then an easy matter to catch the edges of the last-named muscles with clip forceps or dissecting forceps, and to draw them downwards and inwards until they meet in the middle line. If the separation and atrophy of the muscles is marked, then it may not be possible to draw them down sufficiently, but in the great majority of cases they can be brought into view as shown (*v.* Fig. 182).

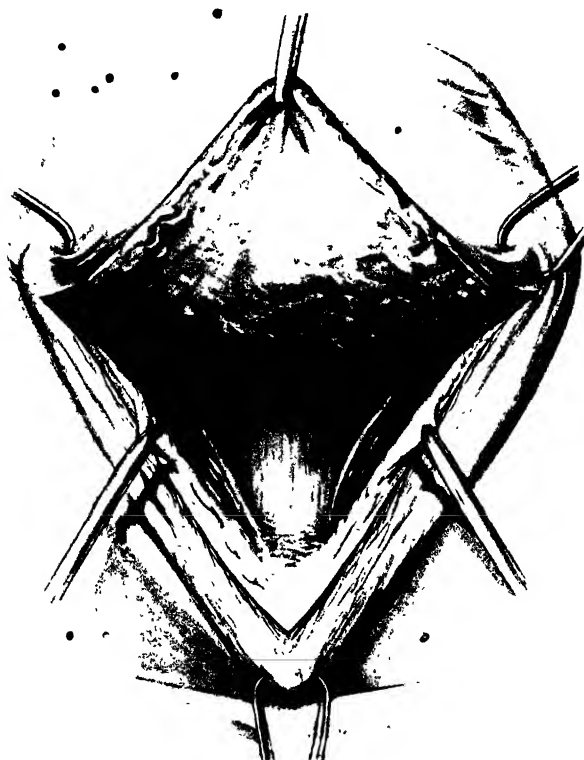


FIG. 182.—Incomplete perinæorrhaphy. The separated levatores ani muscles as exposed after the vaginal flap has been detached.

Three or four interrupted sutures of catgut are then passed through them from side to side, so that when tied they will approximate them in the middle line (*v.* Fig. 183). For the present, however, they are left untied. The next step is to trim the vaginal flap into proper shape, so that, when the operation is complete, there may be no redundancy. The usual line of incision is shown in Fig. 183, and the effect of the removal of redundant tissue in the next figure. The cut edges of the flap are then brought together by a continuous catgut suture passed from above downwards (*v.* Fig. 186), and ending at the vulva.

orifice. This being done, the catgut sutures in the levator muscles may be tied. The last step consists in the introduction of silkworm-gut sutures passed so as to close the skin edges of the perinæal wound. These sutures are passed from side to side, and traverse the skin and

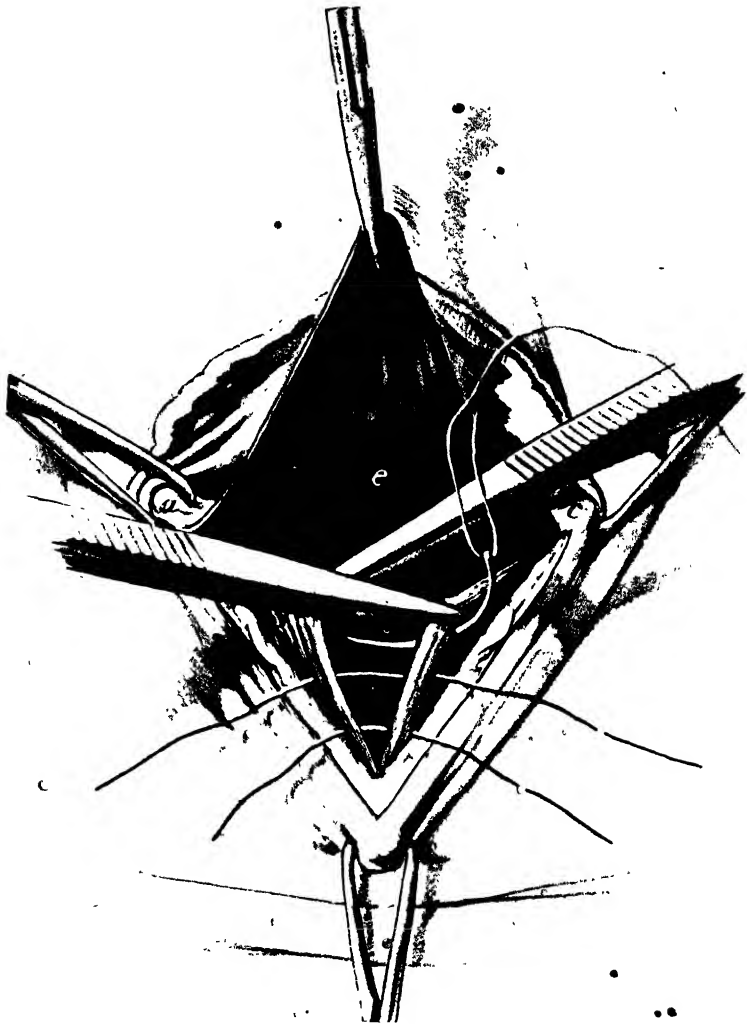


FIG. 183.—Incomplete perinæorrhaphy. The insertion of the muscle sutures.
a, e, c. Line of incision in the vaginal flap.

the remains of the superficial perinæal muscles, also the levator muscles so as to supplement the buried catgut sutures. The method of inserting them will be clearly seen in the illustration (*v.* Fig. 186).

Sometimes during this procedure there may be hæmorrhage from the hæmorrhoidal vessels. Any bleeding vessel, if of large size,

should be caught and tied, but, as a rule, the best method of stopping bleeding is by proceeding rapidly with the operation. If the separation of the vaginal flap has been carried fairly high, there may be a tendency to a collection of blood above the levatores ani muscles, and so a hæmatoma may form, which, if it becomes infected from the rectum, will spoil the result. On this account, we are always very careful to

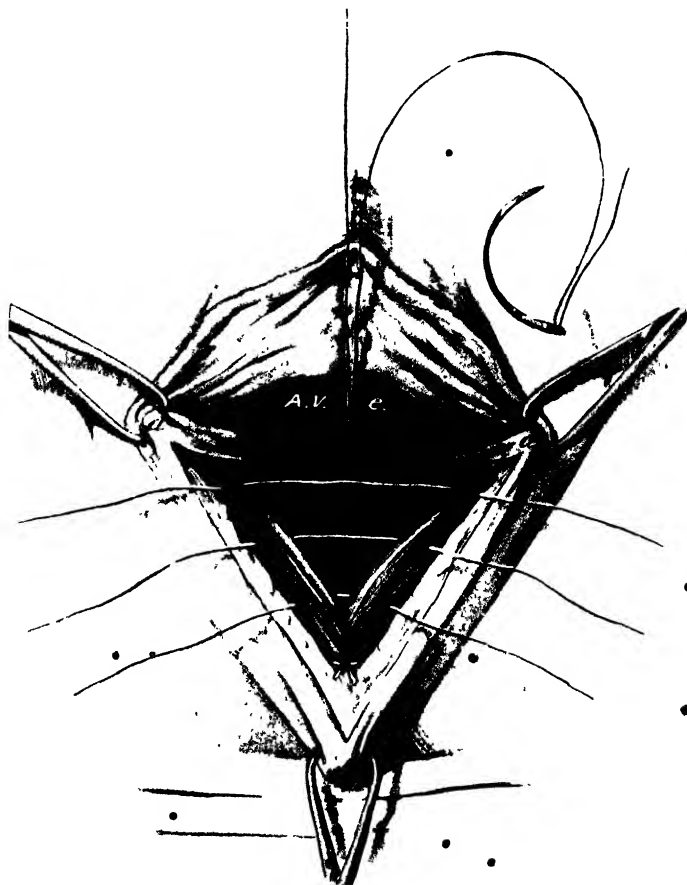


FIG. 184.—Incomplete perinæorrhaphy. The vaginal flap has been cut away. A.V. Anterior vaginal wall. e. Highest point of incision in posterior vaginal wall.

plug the vagina tightly with iodoform gauze at the end of the operation. This gauze, if properly inserted, keeps the vaginal mucous membrane pressed tightly down on the upper part of the muscles and on the rectal wall, and so there is no space left in which blood can accumulate. During the insertion of the gauze the sutures in the posterior vaginal wall must be protected by a suitable flat and narrow-bladed retractor (v. Fig. 234).

II. COMPLETE COLPO-PERINÆORRHAPHY.—The operation which we practise for a complete tear of the perinæum is practically identical with the preceding operation, except that it includes the necessary measures for the repair of the tear in the rectal wall, and for the restoration of the sphincter ani muscle. The operation is as follows :—The extent of the tear, and particularly the extent to which it involves the rectal wall, is first carefully ascertained, and

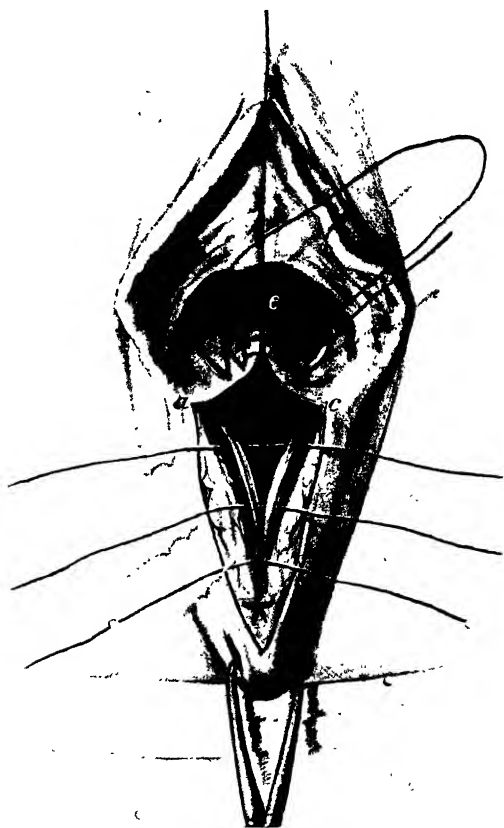


FIG. 185.—Incomplete perinæorrhaphy. Continuous suture of the posterior vaginal wall.

then the positions of the ends of the divided sphincter muscle. These ends are retracted outward, and usually cause small depressions or pits in the skin as they retract. The position of these pits is often very obvious, and shows clearly the position of the torn end. If we look at Fig. 187, we shall see the position of the skin incision, which consists of three parts :—one part, which passes through the line of junction of vaginal mucous membrane and skin at each side ; a second part, which passes through the line of junction of the rectal

and the vaginal mucous membranes; and a third part, which passes posteriorly at each side of the anus in order to expose the divided fibres of the sphincter ani muscle. The first step of the operation consists in turning the complete tear into an incomplete tear by the suture of the torn edges of the rectal wall. Accordingly, in most cases, it is well to begin by making the second and third parts of the incision, and to leave the first part until later, as thus unnecessary bleeding can be



FIG. 186.—The perinæal sutures in place.

avoided. These incisions are made with the scissors, and then the edges of the torn rectal wall are pared so as to make them as wide as possible, and are brought together with a continuous catgut suture, passed from above downwards (v. Fig. 188). This suture should pass through the entire thickness of the wall, with the exception of the mucous membrane. The torn ends of the sphincter muscle are next dissected out, and are caught with clip forceps and drawn towards the middle line. A mattress suture or a simple side-to-side suture of catgut can then be passed through the ends (v. Fig. 189), and this,

when tied, brings them together across the anterior wall of the anal canal (c. Fig. 190). The next step consists in making an incision at each side round the junction of skin and vaginal mucous membrane, and in dissecting up the remainder of the vaginal flap. The levatores ani muscles are then drawn out and sutured, as before, and the vaginal flap is trimmed to the required shape. Next, its edges are



FIG. 187.—Complete perinæorrhaphy. *a, b, c, d.* The three parts of the incision between the vaginal mucous membrane and the skin and rectal wall.

brought together by a continuous catgut suture, and, lastly, the edges of the skin incision in the perinæum are brought together by interrupted sutures of silkworm-gut.

Complications.—The only special complication which need be feared is the wounding of the rectum either with the scissors or needle, and the subsequent formation of a recto-vaginal fistula. Wounding with the scissors is most unlikely to occur. Also, if care is taken always to

pass the perinæal sutures parallel to the rectum, and perpendicular to the skin surface, and never to direct them backwards, it is usually unnecessary to pass the finger into the rectum as a guide, although, if there is any doubt as to the exact situation of the rectum, this precaution should be taken. If such a precaution is adopted, the operator

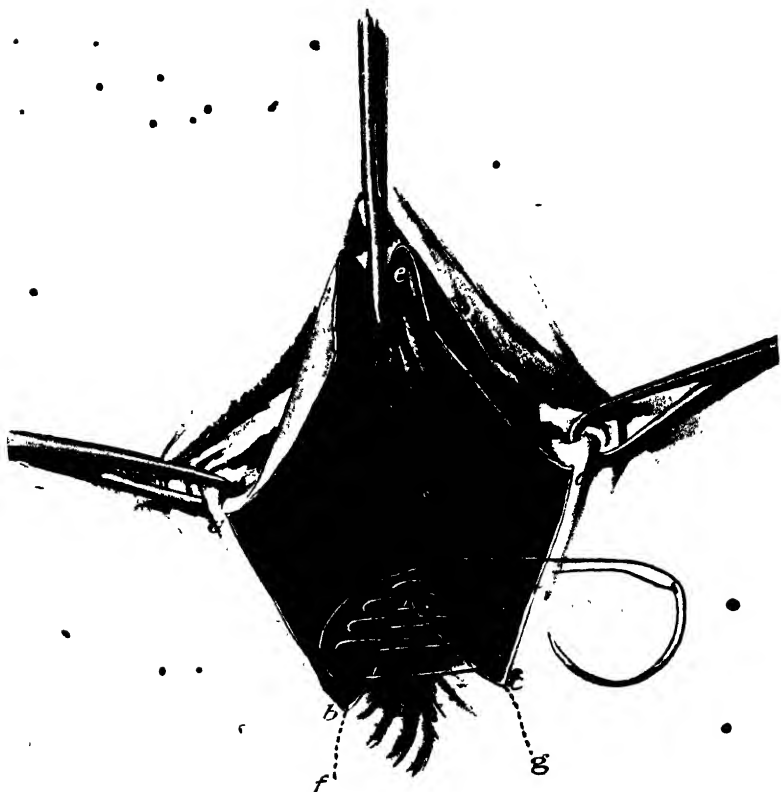


FIG. 188.—Complete perinæorrhaphy. The closure of the tear in the rectal wall with a continuous suture.

should change the glove on the infected hand, as soon as he withdraws his finger from the rectum. Even if a suture does accidentally pass into the rectum, the danger of a fistula resulting is very slight, but such an occurrence imports another danger into the case, *i.e.*, the risk of infecting the wound.

After-treatment.—Boric powder is freely dusted over the perinæum, which is then covered with a sterilised dressing and a T bandage.

This dressing must be changed whenever the bladder is emptied. The external parts are carefully washed night and morning, and kept as dry as possible. The gauze plug is removed from the vagina the day



FIG. 189.—Complete perinæorrhaphy. The approximation of the ends of the torn sphincter ani.

after operation. It is well to pass a catheter every eight hours for the first two or three days after operation, in order to prevent urine from trickling down on the wound. If there is any putrefactive or purulent discharge the vagina should be douched, otherwise it is unnecessary to do so. Silkworm-gut sutures should be removed

on the eighth day; the catgut sutures are absorbed. The patient may sit up in bed on the tenth to the sixteenth day, according to the amount of tissue which has been removed and the consequent strain upon the sutures, and may leave her bed a day or two later.

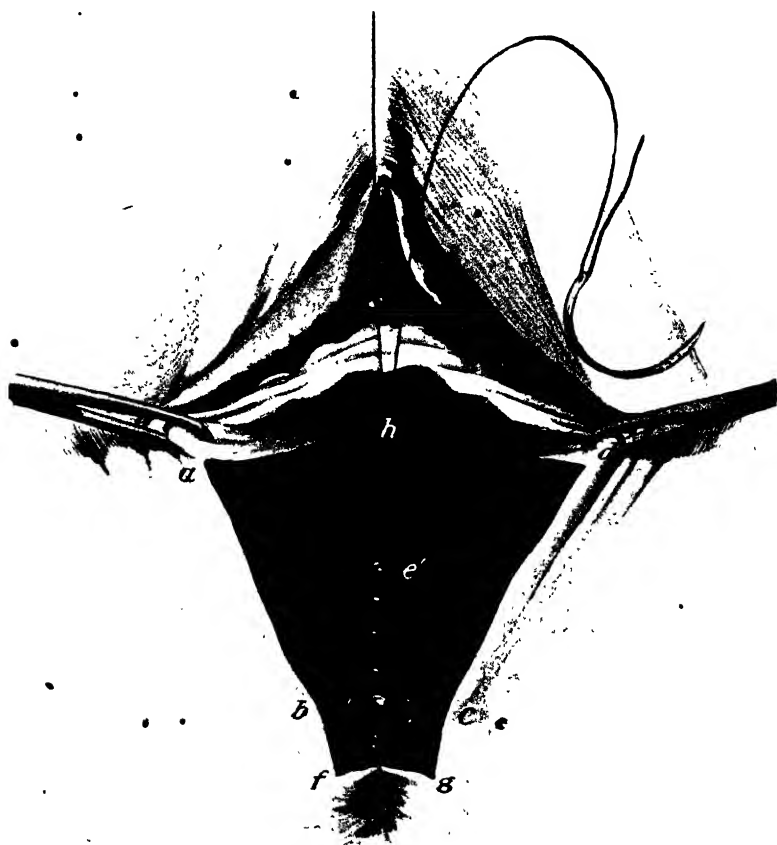


FIG. 190.—Complete perineorrhaphy. The sphincter ani is sutured, and the vaginal flap has been trimmed.

In order to avoid any risk of the accumulation of hard feces in the rectum, it is well to give a purgative on the evening of the second or third day after the operation in cases of incomplete perineorrhaphy, and to administer an enema of olive oil just before the bowels act. In the case of complete perineorrhaphy the bowels are kept confined for from three to four days, and then are carefully emptied by giving

repeated doses of a saline aperient followed by an enema of olive oil, just before evacuation occurs, in order to break up the solid fæces in the rectum. In all cases it is very necessary that the bowels should be emptied by purgatives and enemata before the operation, in order to remove any hard masses that may be present.*



FIG. 191.—Anterior colporrhaphy. An oval flap has been removed from the anterior vaginal wall, and the edges of mucous membrane are brought together by a continuous catgut suture, so as to cover the denuded area. B. Bladder.

ANTERIOR COLPORRHAPHY.

By the term anterior colporrhaphy (κόλπος, a vagina; ραφή, a seam) is meant the narrowing of the vagina by the removal of a portion of the mucous membrane of the anterior vaginal wall.

Indications.—Anterior colporrhaphy may be indicated in certain cases of cystocele.

Instruments.—The same instruments are required as for perinæorrhaphy.

* The illustrations reproduced here of both forms of perinæorrhaphy so closely resemble those appearing in the last edition of the late Dr. Herman's "Diseases of Women," that it might be thought that they are copies of his illustrations, particularly in view of the fact that they are done by the same artist. I therefore wish to point out that it is impossible for them to be copies, since they were made several months before the drawings produced in Dr. Herman's book were made. Further, my drawings were made with the object of illustrating the operation which I habitually practise.

Operation.—The cervix is drawn downwards as far as possible, by means of an American forceps fixed on its anterior lip. The mucous membrane just below the urethra is seized in a second forceps applied in the middle line in such a manner that by traction in opposite directions on both forceps the anterior vaginal wall can be made tense. If necessary, this tension can be increased by two forceps inserted laterally, and so far distant from one another that their easy approximation is just possible. An incision, surrounding an oval piece of mucous membrane, is then made with a scalpel (v. Fig. 191), the enclosed mucous membrane is peeled off, and the bladder is exposed. The latter is then carefully detached from the anterior vaginal wall and pushed upwards, exactly as is done when performing anterior colpotomy (v. Fig. 237), and the edges of the wound brought together with a continuous catgut suture. Care must be taken, when making the initial incision, to go through the entire thickness of the mucous membrane, as otherwise its complete removal is much more troublesome. If there is considerable tension on the sutures, it is well to supplement and support the continuous catgut suture by a couple of interrupted sutures of silkworm-gut.

Complications.—The only complication which is at all likely to occur is the wounding of the bladder, either while dissecting off the flap or during the process of suturing. On account of the possibility of this accident, it is always safer, as well as being more rapid, to peel off the flap, whenever possible, instead of dissecting it off.

After-treatment.—The after-treatment is similar to that adopted after colpo-perinæorrhaphy. The sutures, if catgut, will be absorbed. The patient may sit up on the tenth day.

INJURIES WHICH TEND TO PRODUCE FISTULOUS COMMUNICATIONS BETWEEN THE GENITAL TRACT AND OTHER ORGANS.—Fistulæ between the genital tract and neighbouring organs have become much less common than they were formerly. This result can be almost entirely attributed to the great advances which have been made in obstetrical practice, as it is during labour that such conditions usually begin.

Ætiology.—Fistulæ may arise as the result of one or other of the following causes :—

(1) *Ulceration.*—Ulceration, of such a nature as to cause a fistula, is usually brought about by the prolonged presence of the foetal head at the pelvic brim, or in the pelvis, during labour. It may also be caused by malignant disease, tuberculosis, abscess formation, the long-continued pressure of foreign bodies—as pessaries—in the vagina, phlegmonous vaginitis, and syphilis.

(2) *Surgical interference.*—A fistula may be produced accidentally

in the course of a surgical operation, or it may be formed deliberately, as in the treatment of cystitis.

(3) Congenital malformations.—Fistulæ due to this cause properly come under the head of “deformities.” They are not, however, of very great importance; and, as their treatment, whenever possible, is the same as that of other forms of fistulæ, they need only be mentioned here. They are found in three situations:—as a urethro-vaginal fistula, the result of hypospadias; as a uretero-vaginal fistula; and as a recto-vaginal fistula.

Varieties.—The following varieties of fistulæ may occur:—

- | | | |
|---------------------|---|----------|
| (1) Urethro- | } | vaginal. |
| (2) Vesico-cervico- | | |
| (3) Vesico- | | |
| (4) Uretero- | | |
| (5) Recto- | | |
| (6) Entero- | | |
| (7) Vesico- | } | uterine. |
| (8) Uretero- | | |
| (9) Recto- | | |
| (10) Entero- | | |

Of these various forms, much the most common is a vesico-vaginal fistula occurring as the result of sloughing after labour. This form may also occur as a result of malignant disease which has extended from the cervix to the vagina and bladder. Recto-vaginal fistulæ are perhaps the next most common, but they are much rarer than vesico-vaginal. They may be traumatic in origin, or the result of malignant disease. Urethro-vaginal fistulæ are usually caused by traumata during, or by sloughing after, labour. Occasionally, the entire urethra may have been destroyed, as in the case shown in Fig. 193. Recto-uterine fistulæ are probably always the result of malignant disease. Vesico-uterine fistulæ are said to be always vesico-cervical, as the body of the uterus is not in direct contact with the bladder. This is probably true in the case of fistulæ which follow sloughing from long-continued pressure; but, in the case of ulceration due to malignant disease, it is quite possible to have a fistula between the bladder and the body of the uterus. Uretero-vaginal and uretero-uterine fistulæ may be the result of malignant disease, or of injury during such operations as hysterectomy. Entero-vaginal and entero-uterine fistulæ may be the result of abscesses in the peritoneal cavity which have burst both into an intestine and into the uterus, and of malignant disease.

Symptoms.—Vesical and ureteral fistulæ give rise to incontinence of urine, the urine escaping directly into the vagina in the case of vaginal fistulæ, or through the os externum in the case of uterine

fistulæ. Urethral fistulæ give rise to the escape of urine into the vagina during micturition. Rectal and intestinal fistulæ give rise to incontinence of fæces and gas.

Diagnosis.—The diagnosis of a vesical fistula is as a rule easily made. The only condition which can simulate it is incontinence of urine due to relaxation of the sphincter, but, in this condition, urine



Fig. 192.—Large vesico-vaginal fistula with cervical tear, the result of injury during labour.

can be seen escaping from the orifice of the urethra. It is, however, sometimes extremely difficult to determine the exact situation of small fistulæ. This as a rule can best be done by injecting the bladder with some coloured solution, such as permanganate of potash or weak cyllin, and then, if the opening is of sufficient size, the fluid will be seen escaping through it. Where the opening is so small that a visible quantity of the injecting fluid cannot be forced through, Pozzi

recommends the application of a piece of blotting-paper to the vaginal wall after first drying the latter thoroughly. The moist absorption area



FIG. 193.—Complete destruction of the urethra associated with complete laceration of the perinaeum. B. Neck of bladder where the urethra was torn across. A. Anterior vaginal wall. P. Remains of perinaeum. R. Posterior rectal wall. V. Vagina. F. Mucous flap, the result of previous attempts at restoration of urethra. C. Clitoris. M. The original site of urethral orifice.

on the paper will show the situation of the opening. If the fistula opens into the cervix, the latter must be dilated as far as possible,

and then the opening may be found by means of a stylette. Ureteral fistulæ are more difficult to diagnose. In their case, coloured fluid injected into the bladder does not escape through the fistula; the urine which escapes comes intermittently as little gushes; if the bladder is examined with the cystoscope, the flow from one ureter is seen to be stopped either wholly or partially; if the ureters are catheterised, an obstruction to the passage of the catheter will be found at one or other side; and, lastly, if a coloured solution is injected through the catheter into the obstructed ureter, the solution will escape through the fistula.

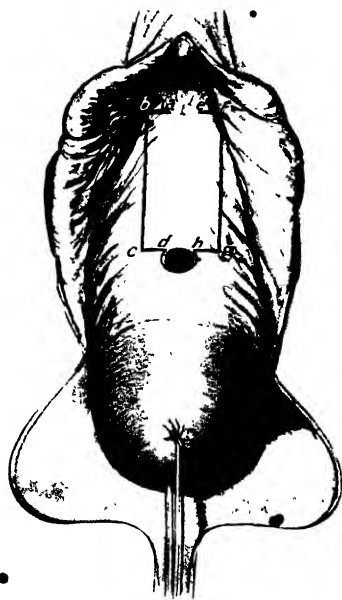


FIG. 194.—The formation of a new urethra. *a, b, c, d* and *h, g, e, f*. The rectangular incision made at each side.

Rectal fistulæ are usually of much larger size than are vesical fistulæ, and, consequently, are easy to recognise.

Treatment.—In all cases of fistulæ, except in those of malignant origin which are obviously hopeless, an attempt must be made to cure the condition. In recto- and vesico-vaginal fistulæ of small or moderate size, operative treatment is usually successful, and even in the case of cervical and uterine fistulæ cures have been obtained by modern methods. The most difficult cases of all are those in which the ureter opens into the vagina, and next to these are the cases in which there is almost complete destruction of the anterior vaginal and posterior vesical walls.

Urethral fistulæ, if they are very small, can be cured by revivification and suture of the edges ; if they are large, their cure is very troublesome and sometimes necessitates the reconstruction of almost the entire urethra. This proceeding is carried out by means of flaps taken from the labia minora, from the recto-vaginal septum from the vagina, or from both the vulva and vagina (v. Figs. 194, 195). As a rule, it is recommended first to make a urethral canal and then to connect it with the bladder at a subsequent operation. In cases of very extensive ulceration, where there is no tissue from which flaps can be made the vagina has been obliterated in such a manner as to leave

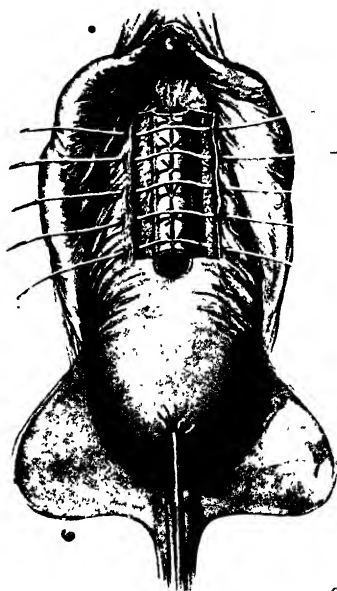


FIG. 195.—The formation of a new urethra. The vaginal flaps have been turned in and sutured together, and the sutures in the outside cut edges of vaginal mucous membrane are in place.

an anterior canal, which will take the place of the urethra, or to leave a recto-vaginal fistula by means of which the bladder can empty itself into the rectum.

Vesico-vaginal fistulæ are more amenable to treatment. In cases due to sloughing after labour, the best time at which to operate is from six to eight weeks after that event. If the vaginal walls are much inflamed and covered with urinary salts or sloughs, they must be treated by frequent douches, glycerine and ichthyol plugs, and mild caustics, so as to bring them into as healthy a condition as possible. In all cases, cicatrices, which prevent the walls of the fistula being drawn together, must be divided. In cases of small or

medium-sized fistulæ, the ordinary operation of revivifying the edges of the opening and then suturing them together is sufficient. With the patient in the dorsal position, the fistula is exposed by means of a speculum and lateral retractors if necessary. It is then drawn downwards as far as possible, by means of an American forceps on the cervix, or on the vaginal mucous membrane just above its upper edge, as suits best. The cicatricial tissue surrounding

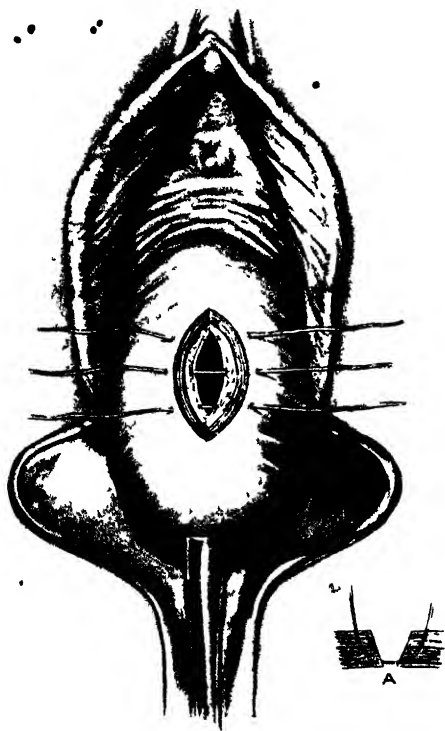


FIG. 196.—Marion Sims' operation for vesico-vaginal fistula. The method of inserting the sutures. ●A. A suture in position.

the fistula is carefully dissected away, if possible in a complete ring, down to, but not including, the bladder mucous membrane (v. Fig. 196). Finally, sutures of silkworm-gut are passed, half a centimetre ($\frac{1}{2}$ in.) apart, and in a direction at right angles to the long axis of the fistula. These sutures enter about three millimetres ($\frac{1}{8}$ in.) from the edge, and traverse the entire wall with the exception of the mucous membrane of the bladder. They pass across the fistula to enter the opposite wall just outside the mucous membrane of the bladder, and emerge at the corresponding point on the vaginal wall to

that at which they were entered (*v.* Fig. 196, A). When the sutures are tied, any puckering of the vaginal mucous membrane between them is adjusted by means of fine catgut sutures.

If the vesico-vaginal septum is very thin—a condition which of course tends to make it more difficult to obtain a firm hold for the sutures—a flap-splitting operation is usually essential, and this enables a wider area of union to be obtained. This is also a better operation



FIG 197.—Flap-splitting operation for vesico-vaginal fistula. *a, b.* The incision.

than simple revivifying of the edges, even in the case of quite small fistulæ. It is carried out as follows:—

An incision is made with a fine scalpel round the fistula at the junction of the vaginal and bladder mucous membranes. This incision is extended transversely at both sides for about a centimetre (*v.* Fig. 197). The vaginal mucous membrane is then dissected off the bladder wall for a distance of about an inch above and below the transverse incision, so that two lips—an upper and a lower—are formed from it. The sutures are passed in two layers. The first includes the bladder wall with the exception of the mucous membrane,

and is of catgut. The second includes the entire thickness of the vaginal mucous membrane, and is of thin silkworm gut (*v.* Fig. 198, A).

The operations required in the case of large fistulæ are very complicated, and need not be described here. This remark also applies to operations for the cure of vesico-cervical or vesico-cervico-vaginal fistulæ, ureteral fistulæ, and entero-vaginal fistulæ.

Recto-vaginal fistulæ can as a rule be easily cured by means of a



FIG. 198.—Flap-splitting operation for vesico-vaginal fistula. The vaginal mucous membrane has been reflected up and down, and the sutures inserted. A. A superficial and a deep suture in position.

flap-splitting operation or by simple revivification of the edges, except in cases which are the result of malignant disease. If the fistula is situated in the lower third of the vagina and the perinæum has also been torn, the best course is to perform a colpo-perinæorrhaphy in the ordinary way, and to treat the rectal opening as if it was part of a complete tear, that is, to close it by sutures after revivifying the edges.

CHAPTER XV.

GENITAL ATRESIÆ.

Genital Atresia: Varieties—Symptoms—Diagnosis—Prognosis—Treatment.

ATRESIA (ἀ, negative; τετραίνω, I perforate) 'of any part of the utero-vaginal canal may occur as the result of a failure of development and so be congenital, or as an acquired condition,—as from sloughing caused by too free use of caustics, from malignant disease, or from a badly performed amputation of the cervix or trachelorrhaphy. Congenital atresia are the more frequent. Whether the condition is congenital or acquired, the symptoms and consequences to which it gives rise are similar.

Varieties.—The following are the principal forms which are met with :—

- (1) Atresia at the level of the hymen—imperforate hymen.
- (2) Atresia of the lower or middle portion of the vagina.
- (3) Atresia of the cervix :—(a) at the os externum ; (b) at the os internum.
- (4) Atresia of any portion of one vagina in the case of a double vagina and uterus.
- (5) Atresia of any portion of one cervix in the case of a double or bicornuate uterus.

Symptoms.—Atresia of any portion of the utero-vaginal canal does not, as a rule, cause sufficient symptoms to lead to its discovery until the onset of puberty. From this on, at each succeeding menstrual period, the symptoms become more marked. At first, they consist of slight pain, general discomfort, and the usual subjective symptoms of approaching menstruation, without any appearance of the flow—apparent amenorrhœa. These symptoms return every month, and after a time the patient's abdomen increases progressively in size. Each month, the pain, at what ought to have been a menstrual period, becomes worse ; and finally it becomes continuous. At the same time, the lower part of the abdomen is occupied by a tumour which rises out of the pelvis. If the atresia is situated at the hymen, this tumour will consist of the vagina enormously distended with blood—*hæmatocolpos* (Fig. 199, A), also, in some cases, of the distended uterus—*hæmatometra* (Fig. 199, C and D), and tubes—*hæmatosalpinx* (v. Fig. 199, D). If the atresia is situated in the vagina or at the

cervix, similar distension of the cavities above the obstruction will occur (Fig. 199, E, F, and Fig. 200, G, H).

Diagnosis.—If the vulva is examined in cases of imperforate hymen, the condition can be at once recognised. The diagnosis is a little more difficult when the atresia is situated in the vagina, or at the cervix. It is especially difficult in cases of double uterus or double

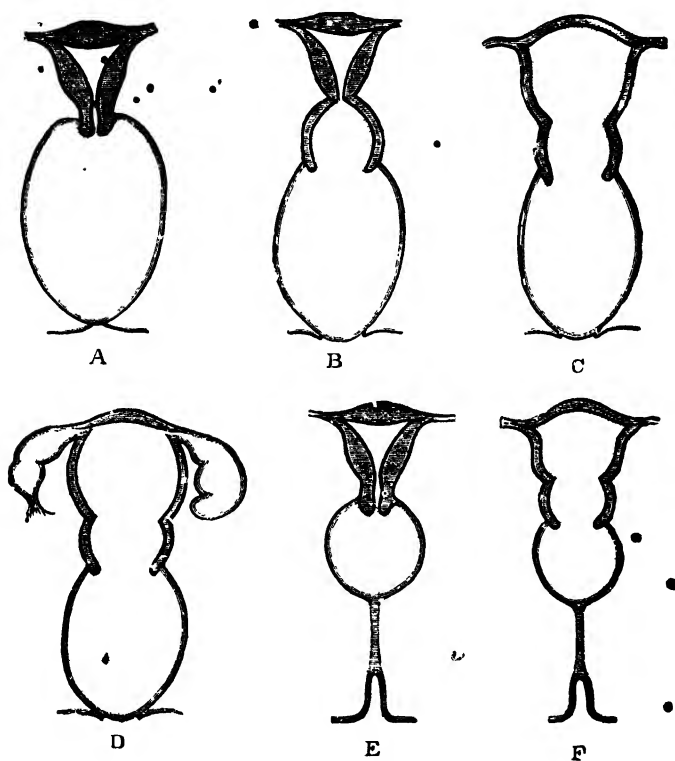


FIG. 199.—Diagram illustrating the effects of atresia of the genital passages. A. Hæmatocolpos. B. Hæmatocolpos and hæmatocervix. C. Hæmatocolpos and hæmatometra. D. Hæmatocolpos, hæmatometra, and hæmatosalpinx. The foregoing are due to atresia of the hymen. E. Partial hæmatocolpos. F. Partial hæmatocolpos and hæmatometra, both due to atresia of the lower half of the vagina. (Sutton and Giles.)

uterus and vagina in which the obstruction is one-sided (Fig. 200, I, J, K, L), as some menstrual discharge appears, coming from the unobstructed side. In these cases, a bimanual examination will usually enable the nature of the case to be recognised, by revealing the presence of a double uterus, but in some cases a double vagina may exist with a single uterus. In such cases the second vagina may be completely closed or open at one or both ends. When it is completely closed, or closed below and open above, dilatation may occur from

the accumulation of blood or mucus. If this happens the condition will probably at first be diagnosed as a vaginal cyst. Microscopical examination of its wall, by showing that the lining membrane is formed of squamous epithelium, will make its true nature clear.

Prognosis.—These cases are more serious than might at first be thought. Their chief danger arises from the ease with which the

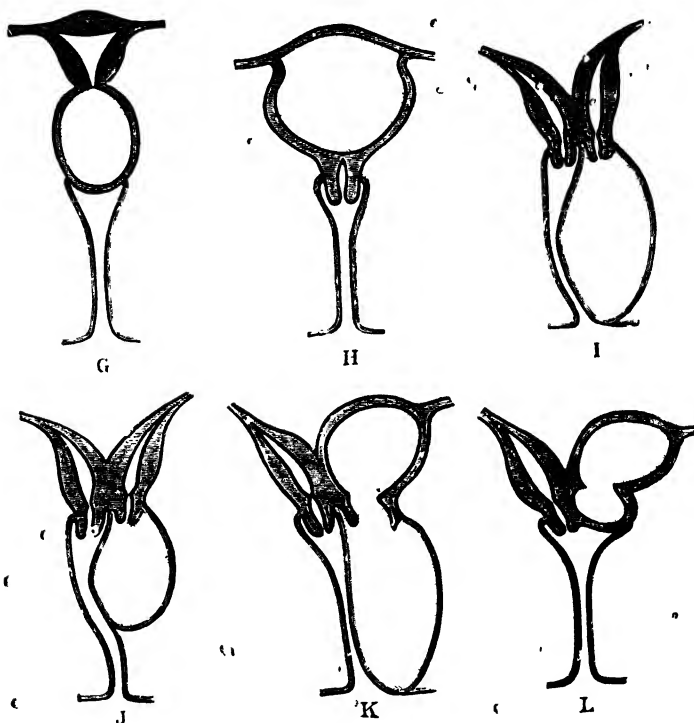


FIG. 200.—Diagram illustrating the effects of atresia of the genital passages. g. Hæmatocervix, due to atresia of os externum. h. Hæmatometra, due to atresia of os internum. i. Hæmatocolpos on one side of a double vagina, due to atresia of hymen of the same side. j. Partial hæmatocolpos on one side of a double vagina, due to atresia of lower portion of vagina of the same side. k. Hæmatocolpos and hæmatometra of one side of a double vagina and uterus, due to atresia of the hymen. l. Hæmatometra on one side of a double uterus, due to atresia of os externum. (Sutton and Giles.)

retained blood becomes septic or putrid after air gains access to it. Another danger is that, in cases of great distension in which the tubes are also involved, adhesions may form between the latter and the intestines, and, as the accumulation drains away and the uterus collapses into its normal position in the pelvis, these adhesions are pulled upon and may be torn, thus permitting the escape of the retained, and possibly toxic, blood into the peritoneal cavity.

The higher up the genital tract the accumulation of blood has

extended, the greater the amount of dilatation present, and the older the retention is, the more serious is the prognosis.

Treatment.—When there is a considerable quantity of accumulated blood, care must be taken to ensure its gradual escape, also to ensure perfect asepsis, not only during the operation itself, but during the entire time the blood is escaping. A small incision is made through the hymen just large enough to allow the fluid to escape, and the latter is allowed to drain into antiseptic cotton-wool, which is frequently changed. As soon as the greater amount of the fluid has drained

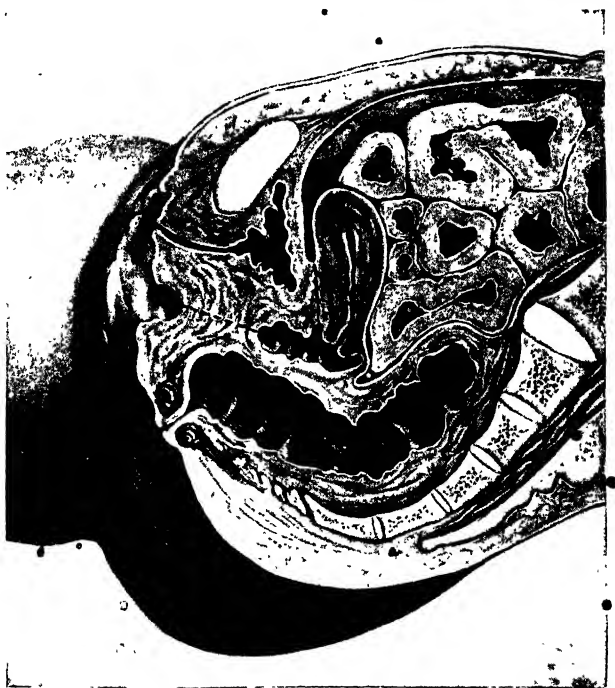


FIG. 201.—Extensive vaginal atresia.

away, the incision is enlarged and the cavity well douched out. If the uterus is involved, it should be plugged with iodoform gauze.

When the atresia is situated in the vagina the case is very much more difficult to treat. It may be possible to dissect a passage through the site of the atresia, or even to form a new vagina where none existed before.

When the cervix is the seat of the atresia, the canal may be opened by dissection or by puncture with a trocar. The former is the safer course. The opening is then enlarged to the required extent, the contents are washed out, and the uterus is plugged with iodoform

gauze. The opening in the cervix must be kept patent until it has acquired a lining of mucous membrane.

When there is a hæmatosalpinx as well as a hæmatometra, the tubes in some cases empty themselves as soon as the uterus is emptied. In other cases, the termination is not so fortunate, and they remain dilated. In such cases it should as a rule be possible to save one or both tubes by performing abdominal section, opening the fimbriated extremity, washing out the contents, and making a new abdominal ostium.

CHAPTER XVI.

INTERNAL HÆMORRHAGE OF GENITAL ORIGIN.

Intra-peritoneal Hæmorrhage.—Ætiology — Symptoms — Diagnosis — Prognosis — Treatment. Extra-peritoneal Hæmorrhage—Symptoms—Diagnosis—Treatment.

INTERNAL hæmorrhage, the result of some morbid state of the pelvic organs, may occur as :—

- I. Intra-peritoneal hæmorrhage.
- II. Extra-peritoneal hæmorrhage.

I. INTRA-PERITONEAL HÆMORRHAGE.—Intra-peritoneal hæmorrhage is the term applied to hæmorrhage into the peritoneal cavity. When such hæmorrhage occurs, the blood is either diffused freely about the peritoneal cavity, or is encysted owing to the formation of limiting adhesions. The former condition is known as diffuse intra-peritoneal hæmorrhage; the latter, as a hæmatocele (*αἷμα*, blood; *λίλη*, a tumour).

Ætiology.—Intra-peritoneal hæmorrhage of genital origin can arise in the following ways :—

- (1) Rupture of the sac of an extra-uterine pregnancy, or the occurrence of tubal abortion.
- (2) Rupture of the uterus during pregnancy or labour.
- (3) Rupture of veins in the broad ligament during pregnancy or labour.
- (4) Perforation of the uterus during an intra-uterine operation, as curetting.
- (5) Slipping of a ligature from a vessel after any intra-peritoneal operation.
- (6) Ulceration of an intra-peritoneal malignant growth, resulting in the opening of a vessel.
- (7) Rupture of an ovarian cyst from trauma or over-distension.

The only form of hæmorrhage with which we are here concerned is that due to the rupture of an extra-uterine pregnancy, or to the occurrence of a tubal abortion, that is the expulsion of an ovum from the tube through the abdominal ostium into the peritoneal cavity.

It is of importance to recognise why in one case diffuse hæmorrhage occurs, and why in another the hæmorrhage is encysted, as in the former

case the amount of blood lost, and hence the danger to the patient's life, is very much greater than in the latter case. All blood poured out into the peritoneal cavity tends to encyst itself, owing both to the clotting of the blood which has been poured out first and to the irritation of the peritoneum by the effused blood,—an irritation which causes a transudation of lymph and a consequent formation of adhesions. Clotting, sufficient to cause a limitation of the blood, is favoured by the gradual occurrence of the hæmorrhage. On the other hand, if the bleeding is very free, there is not time for a sufficiently firm barrier to be formed by the occurrence of clotting to prevent the further escape of blood. Accordingly, there will be a greater tendency to diffuse hæmorrhage when a tubal gestation sac is suddenly ruptured than when a slow process of tubal abortion occurs.

Again, the limitation of the blood by means of adhesions is most likely to occur when the peritoneum is in an unhealthy and easily irritated condition, and when adhesions have already formed. That is to say, *ceteris paribus*, diffuse hæmorrhage is more likely to occur when the peritoneal cavity is healthy, encysted hæmorrhage when pelvic peritonitis is present.

Symptoms.—The symptoms of internal hæmorrhage depend upon the amount of blood lost, and on the rapidity with which it is lost. In serious cases, these are the ordinary symptoms of hæmorrhage:—collapse, rapid pulse, falling temperature, cardiac failure, cold sweats, rapid and sighing respirations, extreme pallor, and coldness of the extremities. To these symptoms are added others due to the presence of blood in the peritoneal cavity:—extreme pain of so severe a character that it is often difficult to tell whether the collapse of the patient may not be due to it alone,—if the hæmorrhage is occurring very gradually this pain is not so well marked; tenderness and distension of the abdomen; and vomiting.

The foregoing are the immediate symptoms at the time of rupture; if the patient survives and the blood becomes encysted, other symptoms appear after a short time. Encysted hæmorrhage is always found in Douglas' pouch, owing to the situation of the rupture and to the fact that the pouch is the most dependent part of the peritoneal cavity. Consequently, if the hæmatocele is of large size, the symptoms will be those of intra-pelvic pressure, such as occur in the case of an impacted ovarian cyst:—pain from pressure on the pelvic nerves; constipation, owing to the coagulation of the ring of blood which surrounds the rectum; and interference with the passage, or, perhaps complete retention, of urine, owing to the displacement forwards of the uterus so as to press upon the base of the bladder.

Finally, during, and as a result of, the process of absorption of the hæmatocele—a process which takes from one to ten months according

to the amount of blood originally lost, the patient suffers from a certain amount of auto-intoxication, as shown by her somewhat jaundiced aspect, her great debility, and the tendency she has to slight fluctuations of temperature. In some cases, the process of absorption does not go on aseptically. Bacteria make their way from the rectum into the hæmatocele, and putrefaction or suppuration of the clotted blood takes place. An abscess thus formed may burst into the rectum or vagina, or, more rarely, into the bladder or intestine, or through the abdominal wall.

Diagnosis.—The diagnosis of diffuse hæmorrhage must be made from the symptoms, as there are no characteristic physical signs.

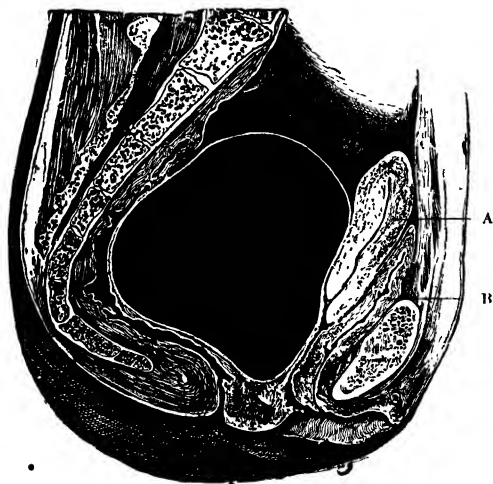


FIG. 202.—Sagittal section of a pelvis showing the effects of a retro-uterine hæmatocele. (Skene.) A. Uterus. B. Bladder. (The relations of the bony parts in the diagram must not be regarded as typical.)

The collapse of hæmorrhage is most likely to be confused with the collapse caused by violent abdominal pain. A small dose of morphia (one-sixth to one-third grain) administered hypodermically will relieve the symptoms if they are merely due to pain; if they are due to a continuing hæmorrhage, it will not do so.

A retro-uterine hæmatocele is felt from the vagina as a rounded tumour which fills Douglas' pouch exactly, depressing and almost obliterating the posterior vaginal fornix, and displacing the uterus forward. At first, the tumour has a soft, semi-fluctuating and boggy feel; later on, as the blood coagulates, it becomes of an almost woody hardness. Perhaps the most characteristic point about a hæmatocele is the manner in which the coagulated blood almost entirely surrounds that portion of the rectum which has a mesentery. This condition

is also met with in the case of an old pyosalpinx, in association with which there is a considerable amount of cellulitis and peritonitis, but in such a case it is not so marked.

A retro-uterine hæmatocele must also be distinguished from a retroverted gravid uterus and an incarcerated ovarian cyst or myoma. A retroverted gravid uterus is distinguished by the history of the gradual onset of the symptoms, and by the fact that the uterus cannot be palpated as separate from the tumour which fills Douglas' pouch; while in a hæmatocele, the uterus is anteposed to the tumour, and consequently the fundus can be felt anteriorly (v. Fig. 202). If a diagnosis cannot be made by a bimanual examination, and the patient's symptoms are urgent, it is better to pass a sound in order to determine the exact relation of the uterus to the tumour in Douglas' pouch, as the mistake of passing a sound into a retroverted pregnant uterus is not fraught with such dangerous consequences for the patient, as would be that of endeavouring to lift a possibly septic hæmatocoe out of the pelvis.

An incarcerated ovarian cyst or myoma can usually be easily diagnosed by the history and symptoms, and by the fact that neither of these growths tends to surround the rectum in the manner which is so characteristic of a hæmatocele, or of old cellutic inflammation, but rather to flatten it against the sacrum.

Prognosis.—The prognosis depends upon whether the hæmorrhage is encysted or diffuse. The prognosis of diffuse hæmorrhage, which is allowed to continue, is extremely bad. In a small proportion of cases, it only a very small vessel is involved, the bleeding may gradually stop owing to the formation of a clot round the vessel's mouth. Sometimes this cessation is only temporary, some slight movement of the patient dislodges the clot, and the hæmorrhage begins again. The prognosis after operation and ligation of the bleeding vessels is wonderfully good, when the condition of the patient previous to the operation is taken into account.

The prognosis in the case of a hæmatocele, which is not removed, varies according to the size of the hæmatocele. All small and a few large hæmatocèles are absorbed aseptically. On the other hand, many large hæmatocèles suppurate, and give rise to a pelvic abscess. In such cases, the prognosis is worse than if operation had been performed before suppuration occurred.

Treatment.—The treatment of diffuse hæmorrhage is to open the abdomen with as little delay as possible, and to remove the ruptured tube as well as the clots with which the peritoneal cavity is filled.

All hæmatocèles which completely fill Douglas' pouch and are large enough to cause pressure on the pelvic organs should be removed, whether they are suppurating or not, as the likelihood of

suppuration occurring is very considerable. If the hæmatocele is aseptic, it is best removed by an abdominal cœliotomy, and at the same time the injured tube can, if necessary, be removed. If it is suppurating, it is certainly better drained by the vagina, as by so doing it is possible to avoid opening into the general peritoneal cavity. A small hæmatocele may be left alone, if we have reason to believe that the ovum is so small that it can be absorbed. If, on the other hand, the ovum is more than two months old, it is improbable that it will be completely absorbed, and an operation is usually advisable. If we decide not to operate, absorption of the effused blood can be facilitated by keeping the patient at rest in bed, and administering hot vaginal douches. If suppuration should occur, the abscess must be opened from the vagina.

II. EXTRA-PERITONEAL HÆMORRHAGE.—The only form of extra-peritoneal hæmorrhage with which we are concerned is that which takes place into the layers of the broad ligament. This condition is known as hæmatoma of the broad ligament.

Ætiology.—Extra-peritoneal hæmorrhage is probably always caused by the rupture of a tubal gestation sac. If the tube ruptures in its upper three-fifths—that is, in that portion which is covered by peritoneum, the effused blood escapes into the peritoneal cavity. If it ruptures in its lower two-fifths—that is, in that portion which is not covered by peritoneum, the blood escapes between the layers of the broad ligament. On account of the limiting effect of the peritoneal investment, the hæmorrhage in these cases is as a rule not very serious.

Symptoms.—The symptoms are those of intra-peritoneal hæmorrhage but are slighter in degree, as the amount of blood lost is usually much less.

Diagnosis.—In the absence of a definite history, the diagnosis of hæmatoma of the broad ligament is often very difficult. The intra-ligamentous situation of the tumour can generally be determined by noting the intimate manner in which it is related to the pelvic wall. Moreover, an intra-ligamentous parametric exudation usually extends to some distance under the pelvic parietal peritoneum, but a hæmatoma rarely does. An intra-ligamentous cyst as a rule is not attached to the pelvic wall, and does not tend to get smaller as does a hæmatoma, but rather to increase in size. In some cases where the rupture has occurred into the left broad ligament, blood may burrow outwards beneath the peritoneum which covers the rectum, and surround the rectum in such a manner as to simulate a hæmatocele. In such a case, the constricting ring invests the second or sub-peritoneal stage of the rectum, and not the first stage, as happens in the case of a hæmatocele.

302 INTERNAL HÆMORRHAGE OF GENITAL ORIGIN.

Treatment.—In the great majority of cases, the only treatment required is to keep the patient at rest, in order to favour the absorption of the effused blood. Suppuration is a very rare complication, as the blood is not usually in contact with an intestine. If such a complication does occur, the abscess should be opened, if possible, from the vagina.

PART II.

MAJOR GYNÆCOLOGICAL OPERATIONS.

CHAPTER I.

CELIOTOMY.

Preparation of Field of Operation—Ventral Cœliotomy—Different Incisions :
• Drainage; Closure of the Abdominal Wound—Operative Complications—
After-treatment; Rest, Diet, Bladder, Intestinal Tract, Dressing of Wound—
Post-operative Complications—Vaginal Cœliotomy—Relative Advantages of
Vaginal and Abdominal Cœliotomy—Anterior Colpotomy—Posterior Colpotomy.

THE PREPARATION OF THE PATIENT.

• As a preliminary to operations on the vagina, the external genitals are shaved and thoroughly scrubbed with soap and water the day previous to the operation; a large compress soaked in 1 in 3,000 corrosive sublimate is placed over the vulva and surrounding skin and kept in place with a T bandage. This compress is again soaked in the antiseptic whenever the patient passes water, and is replaced. Immediately before the operation, the skin of the thighs, perinæum, and anterior abdominal wall is painted over with tincture of iodine, and then the vagina itself is similarly treated, taking great care that the iodine gets access to all folds and crevices. The skin or the mucous membrane must not be wet with water before the iodine is applied, as this prevents the passage of the iodine into the epidermis. Sterilised leggings reaching to the thighs are then placed on the patient's legs, a sterilised sheet is thrown over the abdomen, and a sterilised towel is fixed in position from side to side, so as to cover the anus and buttocks.

If the peritoneal cavity is to be opened *per vaginam*, it is well to douch the vagina and plug it with iodoform gauze the day before the operation; on the morning of the operation, the plugging is removed and the vagina again thoroughly washed and douched. The second douching is not always necessary unless the vagina is in an unhealthy state. • •

In the case of abdominal operations, the patient is given a warm bath on the afternoon before the operation, the skin of the abdomen is washed with soap and water and finally with ether, and a compress, soaked in a one per cent. solution of corrosive sublimate in glycerine, applied over the proposed site of incision. This compress remains *in situ* until the patient is on the operating table, when it is removed, and the skin is painted over with tincture of iodine, or else, as some

operators prefer, it is again washed with soap and water, then with ether, and finally with an alcoholic solution of bin-iodide of mercury 1 in 500.

A large sheet is then thrown over the patient so as to cover her

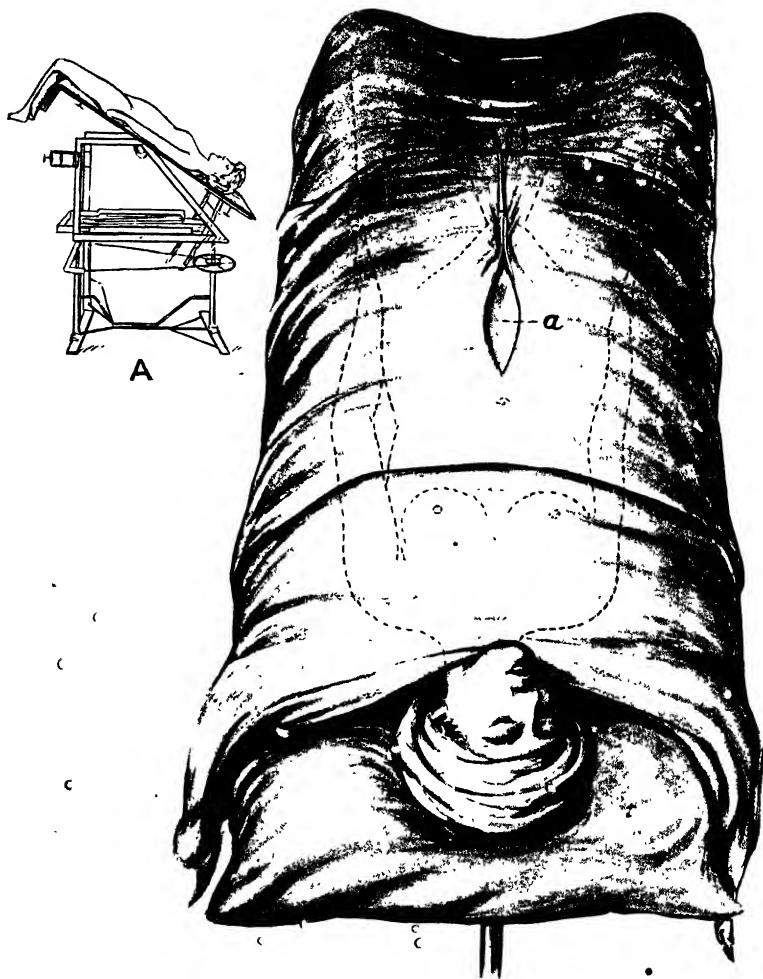


FIG. 203.—The patient prepared for an abdominal celiotomy. *a*. Opening in small sheet corresponding to site of incision. *A*. Side view of the patient in the Trendelenburg position.

completely below the symphysis. A similar sheet covers the upper part of her body and extends down as far as the umbilicus. A third and smaller sheet with an opening corresponding to the proposed site of incision is thrown over the space between the two sheets, in such a manner as to cover completely the interval left between them (cf. Fig. 203).

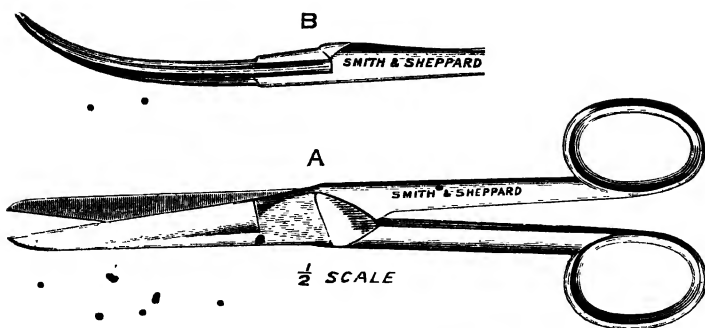


FIG. 204.—Stout scissors. A. Straight. B. Curved.

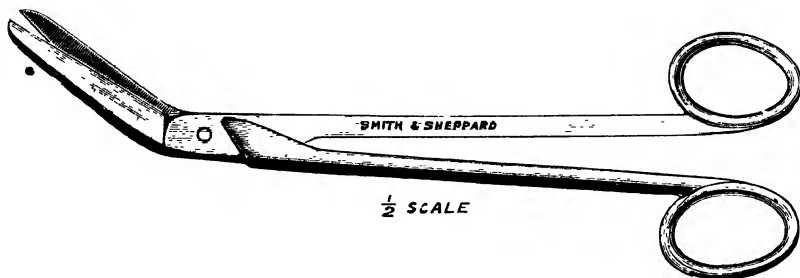


FIG. 205.—Long-handled angle scissors.

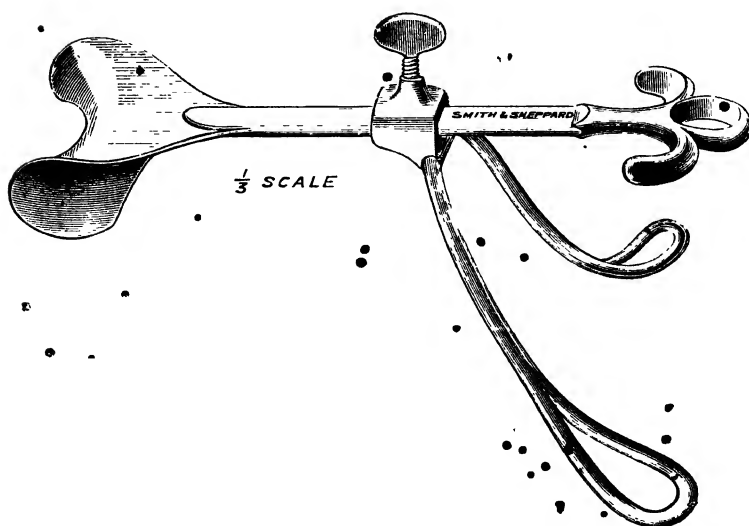


FIG. 206.—Doyen's retractor for abdominal incision, with thigh piece.

VENTRAL CÆLIOTOMY.

CÆLIOTOMY (*κοιλία*, *lit.* a hollow, hence the abdomen; *τέμνω*, I cut; *syms.*, laparotomy [*λαπάρα*, the flank; *τέμνω*], abdominal

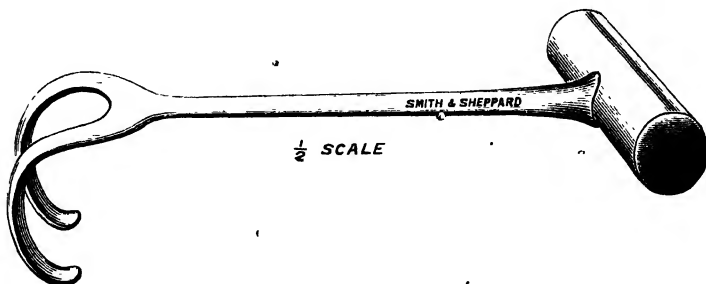


FIG. 207.—Quènu's abdominal retractor.

section) is the term applied to the opening of the peritoneal cavity. It is termed ventral or abdominal cæliotomy or vaginal cæliotomy,

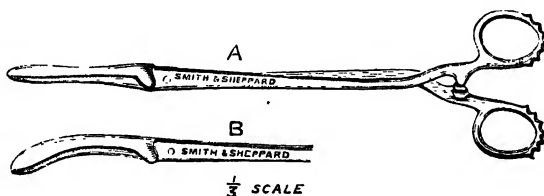


FIG. 208 —Long and slender forceps for peritoneal flaps, etc. A. Straight. B. Curved.

according as the opening is made through the abdominal walls or through the vagina.

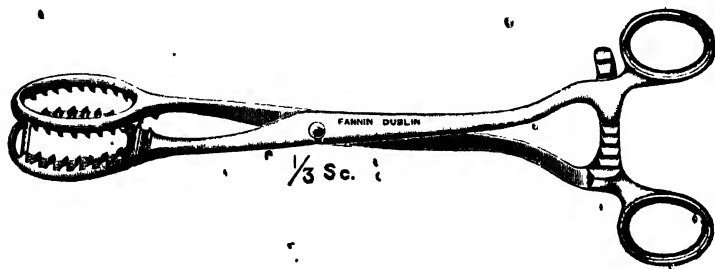


FIG. 209.—Strong uterine forceps for drawing up a uterus which is going to be removed.

Indications.—Ventral cæliotomy is indicated in gynæcological practice for the following purposes:—

- (1) In order to treat or remove pathological conditions of the pelvic organs, when the cure of such conditions is necessary and cannot be obtained by less radical means.

- (2) In order to diagnose obscure pelvic conditions, which so affect the patient's health as to render their cure necessary.

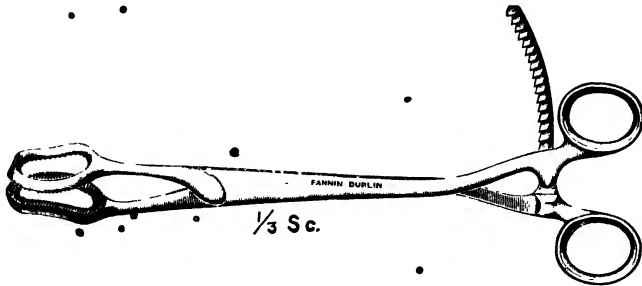


FIG. 210.—Light uterine forceps for drawing up a uterus without injury to it.

Instruments.—The following instruments are required:—Two scalpels; one or two dozen clip-forceps; four pairs of scissors, one sharp-pointed, one blunt-pointed, and one curved on the flat, tolerably stout and with handles of medium length (v. Fig. 204), and one angle

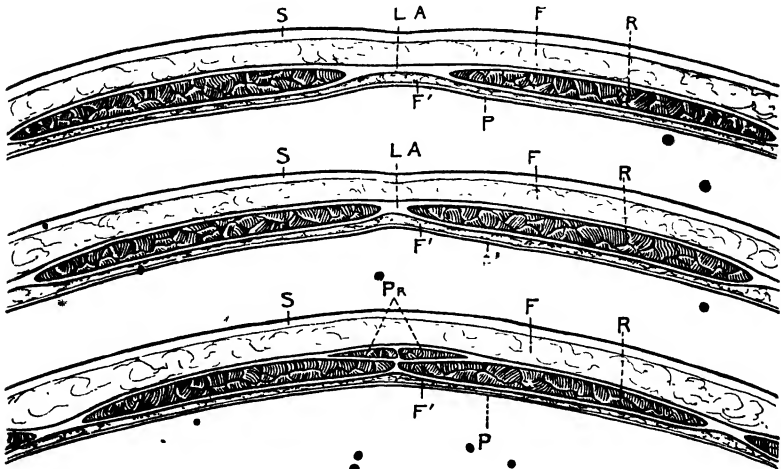


FIG. 211.—Sections of the anterior abdominal wall across the middle line and at right angles to the linea alba. 2. Section midway between umbilicus and symphysis pubis. 1. Section midway between umbilicus and 2. 3. Section midway between 2 and symphysis pubis. L.A. Linea alba. S. Skin. F. Subcutaneous fat. F'. Sub-peritoneal fat. R. Rectus muscle. Pr. Pyramidalis muscle. P. Peritoneum. (From a formalin preparation by Dr. R. A. Stoney.)

scissors with long handles (v. Fig. 205); retractors (v. Figs. 206, 207); four or five long, straight and curved, narrow-bladed clamp forceps (v. Fig. 208); four light and long-handled forceps with short blades, two straight and two curved (v. Fig. 214); three or four dozen sponges

of gauze; needles and needle-holder (*v.* Figs. 221—223); suture materials; two dissecting forceps with sharp teeth (*v.* Fig. 224); a ring forceps for catching and drawing up the body of the uterus (*v.* Figs. 209, 210).

Operation.—There are two main types of incision in use in gynaecological operations (*v.* Fig. 212). The first of these is the usual vertical median incision, made between the umbilicus and the symphysis, and extended upwards as is found necessary. The second is the Pfannenstiel incision, which runs in a crescentic fashion from

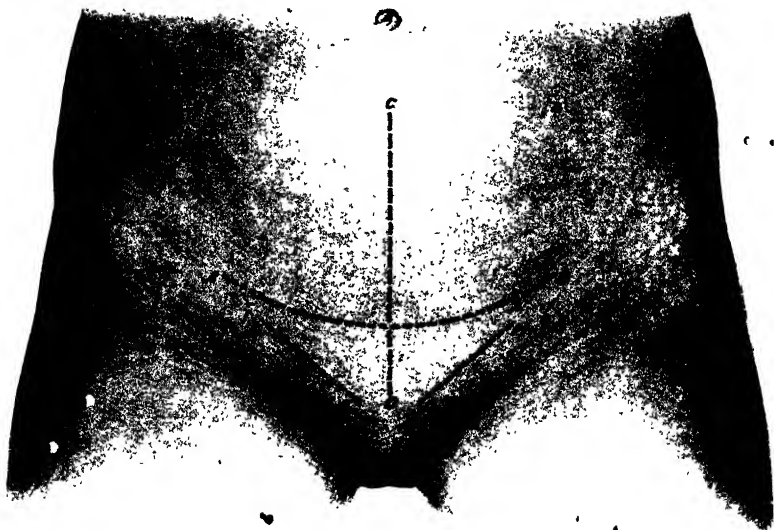


FIG. 212.—Diagram to show the different incisions used in gynaecological work. AB, Pfannenstiel's incision. CD, The usual mesial incision. EF and GH, Incisions to expose the inguinal canals.

side to side, and is parallel to any imaginary line running from one anterior superior spine to the other, following the course of Poupart's ligaments, and the upper margin of the pubic rami. We shall describe each incision separately.

The Vertical Incision.—This incision is made in the middle line through the skin and fat down to the aponeurosis of the rectus muscle, and is at first from three to four inches in length, with its extremities equally distant from the umbilicus and the pubes. Afterwards it can be increased in length in either direction as is found necessary. Bleeding vessels in the fat are caught in a clip forceps, and, if of large size, are tied with catgut. The aponeurosis is then divided, again by a vertica

incision, made preferably a little bit to one side of the middle line. The belly of one rectus muscle is thus exposed, and is drawn outwards,

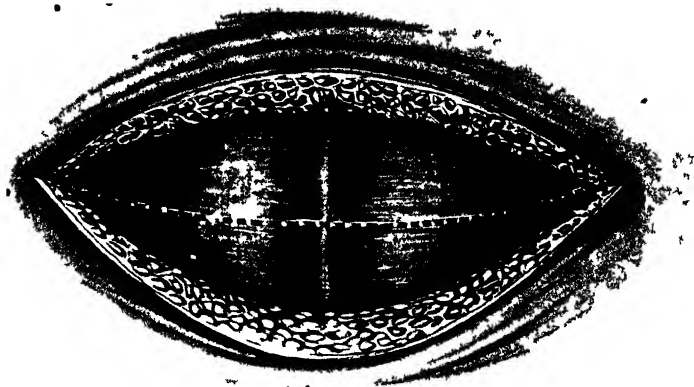


FIG. 213. Pfannenstiel's incision. The transverse incision through the skin and fat. The dotted line marks the position of the division of the fascia.

so as to expose the linea alba. The deep layer of the rectus fascia and the sub-peritoneal fat are then exposed. The fascia is divided with

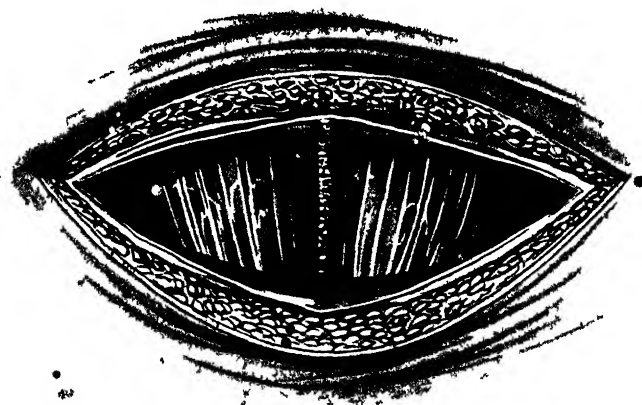


FIG. 214. Pfannenstiel's incision. The fascia divided and separated up and down off the muscle.

the scalpel, and the fat is torn through with the finger. The peritoneum then comes into view, and can be recognised by sight or by touch, if a fold is picked up between the finger and thumb. Such a fold is caught between two forceps, and a very small opening made

in it with the scalpel. This allows air to rush in, and the intestines, if not adherent to the parietal peritoneum, fall back.

The patient may now be placed in Trendelenburg's position, as it is the most suitable position for almost all gynæcological operations. The incision in the peritoneum is then enlarged with the scalpel sufficiently to admit the finger, and, finally, the aponeurosis and peritoneum are divided with scissors, cutting under the guidance of the finger in the peritoneal cavity, to correspond with the size of the in-



FIG. 215.—Pfannenstiel's incision. The muscles retracted laterally and the peritoneum divided vertically.

cision in the abdominal wall. If the incision must be enlarged for any reason, such enlargement is carried out in a similar manner, that is, the skin is divided with a scalpel, and the deeper tissues with the scissors.

As soon as the patient is placed in the Trendelenburg position, the intestines tend to gravitate upwards, and it is well to pack them off carefully from the pelvic cavity by means of long gauze strips.

The Pfannenstiel Incision.—The Pfannenstiel incision runs transversely so far as the skin and the fascia are concerned, but the muscles are separated vertically, and the peritoneum is divided either

transversely or vertically as is desired. The skin incision starts at one side, somewhat inside the anterior superior spine of the ilium, and then runs crescentically across the abdomen, roughly concentric with the line of Poupart's ligaments and of the upper margin of the pubes to terminate at a corresponding point at the opposite side. In stout people, it should correspond with the line of least fat that can usually be found above the mons veneris, and below the excessive development of abdominal fat. The fascia is thus exposed, and is divided transversely along a line corresponding to the skin incision. The upper flap of fascia is then separated from the linea alba, and the lower flap similarly separated. Blunt dissection with the fingers or with a scalpel then enables the bellies of the recti muscles to be separated, and they can be held widely apart with retractors. The peritoneum is thus exposed and opened either transversely or vertically as is desired, in the usual manner.

The vertical incision is the one usually adopted in gynæcological

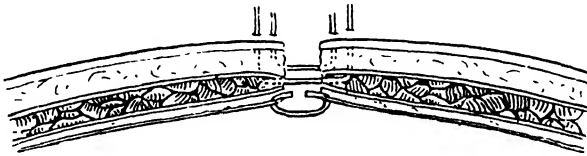


FIG. 216.—Diagram of the simplest method of suturing the abdominal wound.

cases. It enables, as a rule, a wider view of the pelvic contents to be obtained than by a transverse incision, and is more easily extended as is found necessary. The only case in which we should be inclined deliberately to select the Pfannenstiell incision is in very stout women, where, by making it correspond with the line already mentioned, the great deposit of abdominal fat can be avoided. The advantage claimed for the Pfannenstiell incision is a greatly diminished risk of abdominal hernia, inasmuch as the incision through the fascia and the line of cleavage between the recti muscle, instead of corresponding with one another, cross at a right angle. The risk of hernia, however, is not very great in any case, except in women who already suffer from separation of the recti muscles and stretched fascia, and these are just the cases in which the Pfannenstiell incision offers the least advantage.

The Peritoneal Toilet.—As soon as the object for which the peritoneum was opened has been effected, the peritoneal cavity must be cleansed by removing all blood and debris of any kind which may have found its way into it. As a preliminary to this, it is well to

bring the patient back from Trendelenburg's position into the horizontal position, in order that all fluid may find its way into the pelvis. As a rule, gauze sponges will readily remove any fluid or clots, and it is only in rare cases that it will be found necessary to wash out the peritoneal cavity. If a large quantity of septic matter has escaped from a pus tube or a suppurating cyst, and has become generalised through the peritoneal cavity, it is best to wash the latter out as thoroughly as possible. If, however, the escaped septic matter has

FIG. 217.

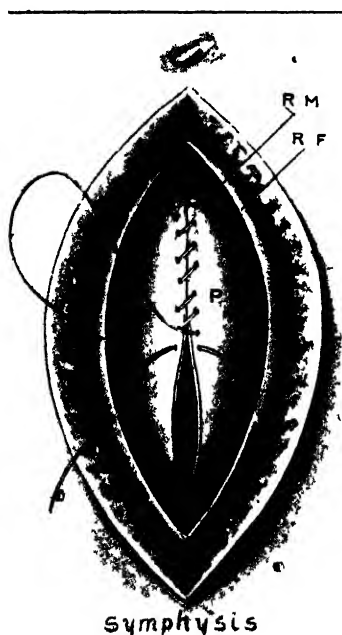


FIG. 218.

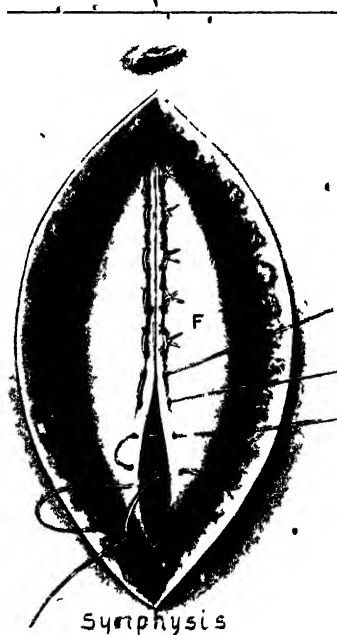


FIG. 217.—Closure of the abdominal incision. First step. The peritoneal edges are brought together by a catgut suture. P. Peritoneum R M. Rectus muscle R. F. Rectus fascia.

FIG. 218.—Closure of the abdominal incision. Second step. The fascial edges are brought together with mattress sutures of silkworm gut. F. Fascia.

not become generalised but has been successfully confined to the pelvis, by carefully walling off the rest of the peritoneal cavity with sponges, it is better not to wash out the cavity, lest such a procedure should cause the infection to become generalised. If the infecting micro-organism is of low virulence, the peritoneum is itself capable of dealing with it, and, if it is of high virulence, we do not think that any amount of washing will avail. If the patient is very much collapsed from the length of the operation and from loss of blood, it is a good practice to pour from two to six pints of normal

saline solution (0.6 per cent.) into the peritoneal cavity and allow it to remain there and be absorbed.

The Closure of the Abdominal Incision.—The proper closure and the complete union of the abdominal wound are most important matters, in order to prevent the subsequent occurrence of ventral hernia. There are two chief ways of doing this. The first is the more rapid, and is therefore suitable for cases in which the saving of time is of great

FIG. 219.

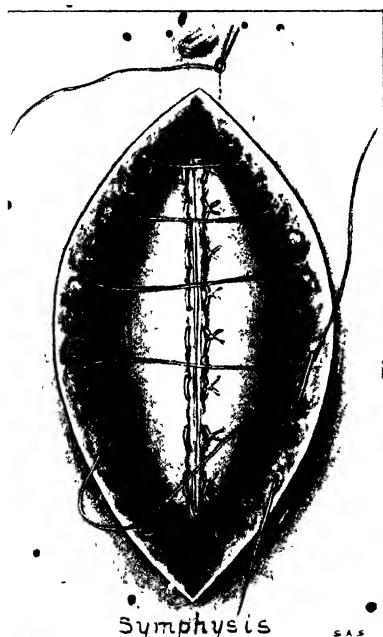


FIG. 220.

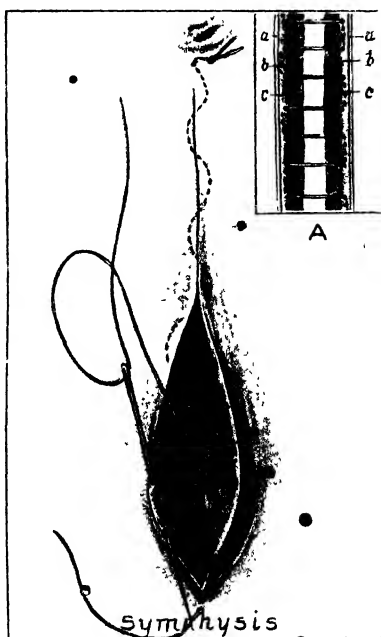


FIG. 219.—Closure of the abdominal incision. Third step. The edges of the fat are laced together by a continuous silkworm-gut suture.

FIG. 220.—Closure of the abdominal incision. Fourth step. The skin edges are brought together by a continuous subcuticular suture. A. Diagram to show method of introducing the subcuticular sutures. *a*. Epidermis. *b*. Cutis vera, through which the sutures are passed. *c*. Fat.

importance. In all other cases, the second method is preferable, as it ensures that accurate fascial approximation which alone can prevent the future occurrence of ventral hernia.

The first method is as follows:—The peritoneal edges and the bellies of the recti muscles are brought together by two rows of continuous catgut sutures. Silkworm-gut sutures are then inserted through the skin at intervals of half an inch along the length of the incision. They traverse the skin, fat, and fascia at one side, then pass across the wound to the corresponding point at the opposite side, and

emerge through the fascia, fat, and skin. They are entered a quarter of an inch from the skin edge, and traverse the fat and fascia at right angles to the surface (v. Fig. 216). If there is any gaping of the skin between them after they are tied, fine catgut or silkworm-gut sutures may be inserted wherever is necessary. This is the method of expedience and never of choice.

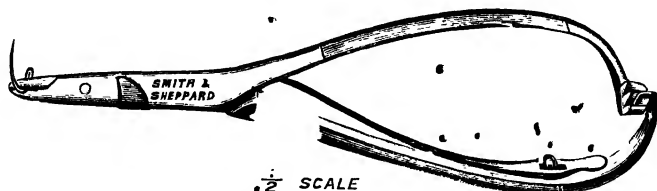


FIG. 221.—Doyen's needle holder

The second method is as follows:—The peritoneum is first closed with a continuous catgut suture (v. Fig. 217), and the same suture is brought back again along the incision, this time approximating the bellies of the recti muscles. The fascia is then drawn out on both sides, and held together, while it is united with mattress sutures of stout catgut. These sutures are entered less than a quarter of an

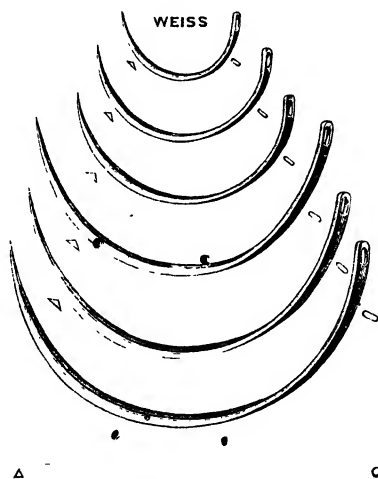


FIG. 222.—Bayonet-bodied needles for gynaecological work, straight and curved.

inch from the cut edge of the fascia. They include half an inch of the fascia, and they lie from a quarter to half an inch apart (v. Fig. 218). Their ends are cut short as they will be buried when the subsequent row is tied. The deep layers of the subcutaneous fat, if at all thick, are next brought together by means of a continuous catgut suture, and lastly the superficial layers of fat and the skin are in turn brought into apposition by two rows of continuous silkworm-gut

sutures. The method of passing these last sutures is as follows:—Two long silkworm-gut sutures are knotted together. A straight glover's needle is threaded with one end of the double ligature and passed through the skin in the middle line half an inch above the upper end of the wound. The needle emerges through the subcutaneous fat, and is then passed through the fat at each side of the wound alternately, in such a manner that, when the suture is drawn tight, the cut edges of fat are, as it were, laced together (*v.* Fig. 219). The suture finally emerges through the skin half an inch below the lower end of the wound. The needle is then threaded with the other end of the double ligature, which is lying loose at the upper end of the wound, and is passed through the skin a quarter of an inch from

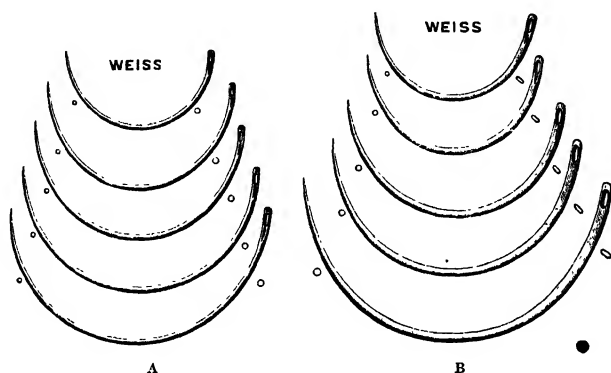


FIG. 223.—A. Round-bodied intestinal needles. B. Round-bodied needles for gynaecological work, when bayonet-bodied are unsafe.

the point at which the first suture was introduced (*v.* Fig. 220). It traverses the wound from above downwards, passing through the subcuticular layers of the skin at each side alternately, in such a manner as to lace the cut edges together. It emerges beside the first suture and a quarter of an inch distant from it, and then the two sutures are drawn sufficiently tightly to bring the cut edges together accurately, and are knotted to one another. Their removal is easy, as all that has to be done is to cut off the knot at one end, and then by pulling on the other end both sutures can be drawn out together or separately. This procedure causes little or no pain.

The Pfannenstiël incision is closed as follows:—The incision in the peritoneum is closed by a continuous catgut suture, and the bellies of the recti muscles are brought together in a similar manner. The transverse incision in the fascia is closed by mattress sutures of catgut, and lastly the skin and fat are closed by subcuticular and deep silkworm-gut sutures. The method of closure is thus practically identical with that adopted in the vertical incision.

The final step of the operation consists in cleansing the skin of the abdominal wall and in dressing the wound. The usual method we adopt consists in drying the skin, and then dusting the wound over with boracic acid powder. It is then covered with several gauze sponges, over which two or three sheets of sterilised cotton wool or cellulose are laid. Another method consists in first thoroughly drying the skin by rubbing it over with a little alcohol, and then covering the incision and adjacent skin with a single thickness of gauze soaked in collodion. As this is drying, it is dusted over with boric powder, and the result is a firm and air-proof dressing, closely adhering to the skin. This is in turn covered with cellulose. Three or more straps of adhesive rubber plaster, of sufficient length to get a firm hold of the skin at the sides of the abdomen, are then placed over the cellulose, and, over all, an abdominal binder.

Drainage.—In the early days of abdominal surgery, it was considered necessary to drain every case, as a presumed safeguard against septic peritonitis. Gradually, however, it came to be recognised that aseptic operations, at any rate, such as hysterectomy for myoma, did not require drainage, but rather ran a more normal

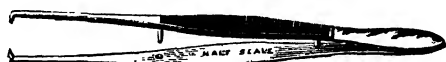


FIG. 224.—Mouse-toothed dissecting forceps. Half scale.

post-operative course if drainage was not adopted. On the other hand, most operators agree that drainage is necessary when septic matter has escaped into the peritoneal cavity, and when both it and its cause cannot be entirely removed; *e.g.*, when a collection of pus, which there is reason to believe is still septic, bursts prior to or during operation, and when it is not possible to remove the entire sac of the abscess cavity. Drainage is also advisable when an intestine has been sutured, if there is any doubt that the suturing has been accurately applied, or if there is any danger that it may subsequently give way. Moreover, many operators consider drainage necessary when the oozing from surfaces denuded of peritoneum is so great that, if not drained, a considerable accumulation of blood-stained serum would result.

Accordingly, three indications may be laid down for the use of the drain :—

- (a) Where undoubtedly septic matter is present, or is likely to make its way into the peritoneal cavity.
- (b) Where sterile matter—blood, serum, or pus—is likely to collect in quantities greater than the peritoneum can be expected to absorb in its existing condition.

(c) When surfaces uncovered by peritoneum are unavoidably left in the pelvis, with the object of preventing the intestines from coming into contact with them.

• Drainage can be carried out either through the lower angle of the abdominal wound, or through an opening made from the floor of Douglas' pouch into the posterior vaginal fornix. The latter route offers great advantages, as any weakening of the abdominal cicatrix is avoided, and the action of gravitation assists the escape of the fluid. It, however, possesses the disadvantages that it necessitates the making of an opening into a possibly septic vagina, and that the subsequent removal of the drain is more difficult. Nevertheless, if the vagina is healthy, vaginal drainage should be employed in almost every case in which a drain is required. In a small number of cases, it may be found advisable to have a counter-opening in the lower angle of the abdominal wound.

• If the case is one of widespread infection, as in general septic peritonitis, it is usually well to make one or more lateral or posterior openings through the abdominal wall. Such openings may be made in the flanks just outside the erector spinæ muscle.

All drainage materials are more or less unsatisfactory. Both glass and rubber tubes are inefficient, and in addition glass is dangerous as tending to produce fæcal fistulæ by causing pressure on the intestines. Gauze, which drains well at first—if used in sufficiently large quantities—ceases to drain after a short time owing to its meshes becoming blocked by fibrin and lymph. It is, as a rule, however, the most suitable material. We may use plain sterilised gauze, in the form of long four-fold strips two inches in width, or iodoform gauze from which the excess of iodoform has been removed by squeezing the gauze out of water. The latter is preferable, as the fluid absorbed by the gauze rapidly decomposes, unless some antiseptic is present.

If we adopt vaginal drainage, an opening must be made from the posterior vaginal fornix into Douglas' pouch, unless such an opening already exists, as in the case of a complete hysterectomy. Such an opening is easily made by pushing up from below a curved forceps into the fornix, and then cutting down upon it from above. One end of the gauze is caught in the forceps and drawn down, and then the pelvis is filled with the remainder (v. Fig. 225), care being taken that a loop of intestine does not lie below it or amongst its folds. A portion of the gauze should be removed on the following day, and then a little more each day until the last piece comes away on the third or fourth day after operation. If the patient's temperature or pulse rate rises, the gauze should be removed completely without delay.

Operation Complications.—The only complication which is likely to occur in the course of a simple ventral cœliotomy is the wounding

of an intestine as the peritoneum is being opened, or during the separation of adhesions. This is an accident which is especially liable to occur when the intestine has become adherent to the abdominal wall in the middle line as the result of former peritonitis. If it occurs, the cut must be immediately sutured with a fine intestinal needle and very fine silk or catgut.

After-treatment.—The after-treatment of abdominal sections may be considered under various headings :—

Rest.—After the operation the patient must be kept as quiet as

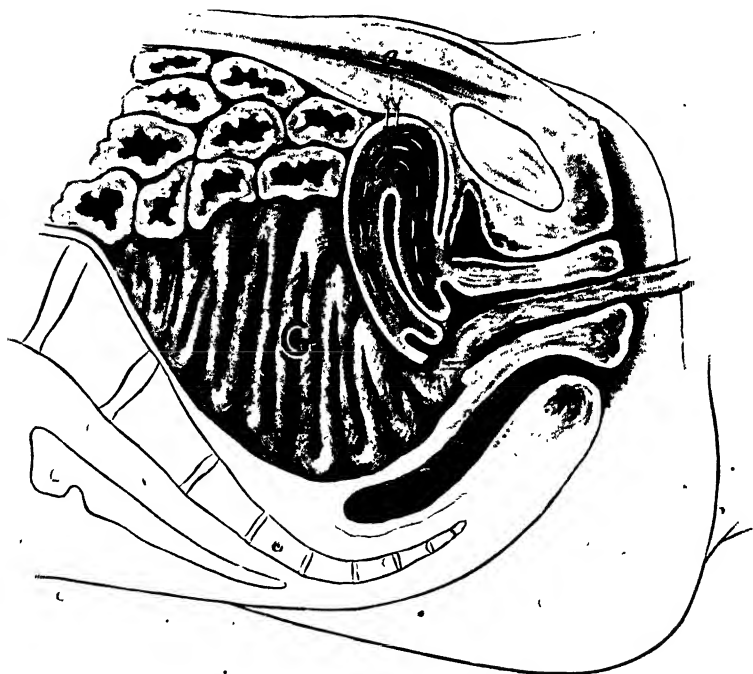


FIG. 225.—Gauze drain in Douglas' pouch, the end of the gauze passing down into the vagina. G. Gauze. a. Suspension sutures of the uterus.

possible. Violent movements while she is still semi-unconscious must be prevented, and for this purpose a special nurse must be in constant attendance. If there is no contra-indication, the earlier the patient is raised on a bed-rest the better, and this is particularly the case in dealing with infected patients. In such cases, we place the patient in a half sitting, half recumbent position as soon as she recovers from the anæsthetic. In other cases, the patient is propped up as a rule the night or day following the operation. Septic patients should be kept sitting up; other patients may lie down at intervals as they wish. This position is particularly advantageous in the case of fat

women, women who are inclined to flatulence and a persistence of anæsthetic sickness, and women who are inclined to pulmonary trouble. On the other hand, it is contra-indicated in cases of collapse, and in a patient whose heart is weak, or who is very anæmic. The value of the sitting-up position was first shown by Fowler, after whom it has been named. When the patient cannot be placed in Fowler's position, she may be turned carefully a little to one or other side by the nurse, but she must not be allowed to turn herself.

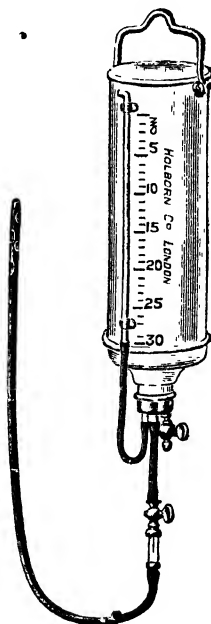


FIG. 226.—Apparatus on the principle of a thermos flask for giving continuous saline injections.

Diet.—For the first twenty-four hours, the less that is given by the mouth the better. Thirst may be relieved by hot water—one or two teaspoonfuls at a time, and, if there is no vomiting, by barley-water or by albumin water. In collapse after operation continuous saline solution must be slowly passed into the rectum. It may be continued for two or three hours at the rate of half of a pint to three-quarters of a pint in the hour. A simple appliance in which the water can be kept at a normal heat and its flow regulated is shown in Fig. 226. If the patient shows intolerance it should be stopped for a couple of hours and then begun again. Sometimes, if the patient is very weak, nutritive enemata must be given every four hours, and the hot water may be replaced by whiskey and water one in three. On the day after the operation milk and water, or

barley-water, or beef essence and chicken broth may be given. As soon as the bowels have moved, the patient may be allowed a little solid food,—tea and toast, a very small portion of the white meat of chicken, and light puddings containing eggs. As convalescence gets more advanced, the dietary may be made more extensive, but it is a good rule for the first week not to give more than one kind of food at each meal.

Bladder.—The urine must, at first, be drawn off every eight hours, if the patient cannot pass it, and the amount measured and noted. The catheter must be passed by sight, after carefully washing the external parts. The patient should be made to pass water naturally as soon as possible, to avoid the continued use of the catheter.

Intestinal Tract.—It is an important matter to note when the patient passes flatus for the first time after the operation, as it shows that the intestines are not obstructed or paralysed. A purgative should be given on the second evening after the operation, as the action of the intestines very much relieves the patient, and probably accelerates the absorption of fluid from the peritoneal cavity. If the patient is inclined to vomit, the medicine most easily borne is calomel in small and repeated doses. Begin with three grains, followed in two hours by two more, or give repeated doses of one grain every two hours until five grains have been given. This may be followed three hours after the last dose by a mild saline, such as a teaspoonful of effervescing citrate of magnesia. If the bowels still do not act, a simple soap and water, or better, a turpentine and oil, enema must be given. If the patient has no tendency to vomit, a drachm of sulphate of magnesia or of sulphate of soda dissolved in two to four teaspoonfuls of water may be given, instead of the calomel, every two hours until the bowels move, or a couple of ounces of Mist. Sennæ Co. in a single dose. Tympanites is sometimes very marked, and causes the patient a great deal of discomfort. If it is not the result of some serious condition, such as septic peritonitis or paralysis of the bowel, it can usually be relieved by the insertion of a short rectal tube, which is allowed to remain in for half an hour or so, or by turpentine enemata. If the tympanites is very marked, relief is sometimes obtained, while waiting for the bowels to act, by applying a turpentine stupe to the abdominal wall, or by lightly drawing over the latter the point of a Paquelin's thermocautery heated to a dull red, in such a manner as to touch the short hairs of the skin without actually coming in contact with the epidermis itself (Kelly). In many cases the patient will get complete relief if she is placed in Fowler's position. If the distension has reached as low as the descending colon, relief may be given by the passage of the long rectal tube. It is, however, a very difficult matter to get this tube above the pelvis

colon, but it is said to have been successfully done with the patient in the knee-chest position.

The Dressing of the Wound.—The abdominal wound ought not to be dressed until the eighth day, unless either a drain has been used or the temperature goes above 100.5° F., or the pulse above 100. If a collodion dressing has been applied, its removal is facilitated by first saturating it with ether, which softens the collodion. The sutures are removed on that day, the wound is re-dressed, and, if properly healed, is not again touched until the second dressing either gets soiled or falls off. It is inadvisable to wet or to wash the wound at this stage, as there is a danger of removing the protective film of clot on the surface of the incision and of carrying in a superficial infection. The patient may be allowed to get up between the tenth and the eighteenth day according to the nature of the case.

Post-operative Complications.—The following are the principal post-operative complications which may occur during the three weeks succeeding a cæliotomy:—

(1) Collapse due to the length of the operation and the anæsthesia, prolonged handling of the intestines, or hæmorrhage during the operation. The treatment of such cases consists in the use of continuous saline injections into the rectum, and, in cases of hæmorrhage, of submammary or intravenous infusion; the administration of stimulants, such as alcohol, ether, strychnine, and digitalis; the raising of the foot of the bed; and the maintenance of the warmth of the patient by hot bottles carefully protected, and by hot blankets.

(2) Secondary hæmorrhage coming on at any time up to forty-eight hours after the operation, due to the slipping of a ligature, or to extensive oozing from a raw surface. The symptoms of such a condition are the gradual collapse of the patient, with falling temperature, rapid pulse, and abdominal pain. If the hæmorrhage is gradual, there may also be intestinal paralysis and tympanites. The treatment consists in immediately re-opening the incision, and finding and controlling the bleeding area.

(3) Septic peritonitis and pneumonia, septicæmia, and pyæmia.

(4) Re-opening of the wound from excessive coughing or vomiting, or from septic infection. This is most liable to occur within twenty-four hours of the removal of the sutures, but it is very unlikely to occur in ordinary cases, if the fascia has been correctly sutured. Whenever the abdominal wall is very thin, with almost complete absence of the recti muscles and stretched fascia, failure of union due to infection may result in re-opening. The same may also occur in patients suffering from cancer, even though the incision is not obviously infected. Necessarily, the greater the abdominal distension, the greater will be the strain on the incision. The treatment of such

cases consists in the immediate re-suture of the incision. When this is impossible, the best course is to draw the edges firmly together with strapping, and, if the intestines tend to bulge between the edges, to keep them back with sterilised gauze soaked in saline solution.

(5) Intestinal paralysis and obstruction. The former is due to sepsis, to excessive handling of the intestines, or to their prolonged exposure during an operation; the latter is due to peritoneal adhesions, adhesion of the bowel to a raw surface, adhesion to a septic area, incarceration through a hole in the mesentery or omentum, or a twist of a loop of bowel round its own axis. Once the existence of septic peritonitis is definitely recognised, immediate re-opening of the abdomen is indicated, followed by washing out of the peritoneal cavity, and free drainage. Similarly, once a definite obstruction is recognised, the abdomen must be re-opened, and the cause of the obstruction found and removed. Further, when the diagnosis is not positive, and the condition of the patient is serious and tending to get worse, it is better to operate with a view to making a positive diagnosis.

(6) Pulmonary embolism, due to the detachment of a clot from a large thrombosed vein, may occur from ten days to three or four weeks after the operation. It is an accident which is relatively more frequent after operations for the removal of myomata on account of the enormous veins which are sometimes divided.

(7) Urinary suppression may occur as the result of the accidental ligation of one or both ureters, or of the failure of the action of the kidneys due to the effect of the anæsthetic, to the length of the operation, or to septic infection.

(8) Fæcal or urinary fistulæ may form as a result of direct injury to the intestinal or bladder wall during the operation, or of post-operative necrosis or sloughing.

VAGINAL CÆLIOTOMY.

Vaginal cœliotomy (*syns.*, colpotomy [*κόλπος*, the vagina; *τέμνω*], vaginal section) is an operation which enables us to operate upon certain pelvic conditions with greater safety, and, in some cases, with greater ease, than does ventral cœliotomy. The opening into the peritoneal cavity can be made either through the anterior vaginal fornix, after separating the bladder from the uterus (anterior colpotomy), or through the posterior fornix, by opening directly into Douglas' pouch (posterior colpotomy) (v. Fig. 227).

A few words must be said with regard to the relative value of vaginal and ventral cœliotomy, especially as their relations to one another are not definitely established. Operating by the vaginal route possesses the following advantages:—

- (1) There is apparently less risk of sepsis.
- (2) There is little or no interference with the intestines.
- (3) If pus is present, it is less likely to spread to the general peritoneal cavity, and after its evacuation better drainage can be obtained.

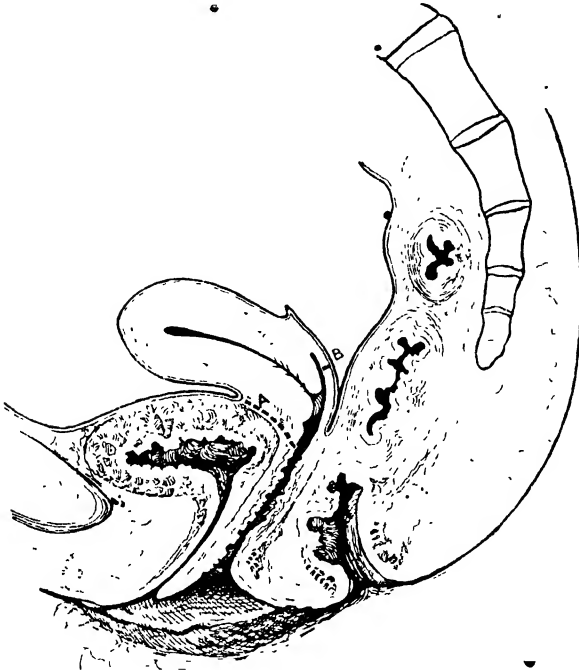


FIG. 227.—Sagittal section through the pelvis of a virgin, showing route followed in anterior and posterior colpotomy. A. Route in anterior colpotomy. B. Route in posterior colpotomy. (From a dissection by L. R. A. Stoney.)

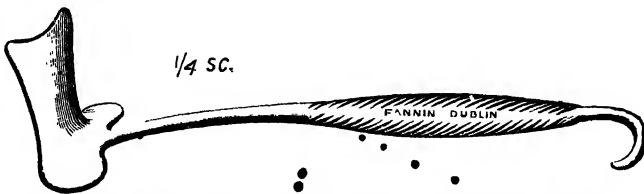


FIG. 228.—Martin's modification of Simon's posterior speculum.

- (4) There are some conditions which can be more easily reached by this route.
- (5) There is no subsequent abdominal scar, and no risk of hernia.

The disadvantages of operating by this route are :—

- (1) The operation takes longer, as a rule.
- (2) In women who have not borne children, the narrowness of the vagina frequently necessitates preliminary dilatation or incision.

- (3) After the peritoneal cavity has been opened, it may be found impossible to remove a tumour on account of its size, its situation, or the nature of the adhesions round it.
- (4) The removal of papillomatous or malignant tumours by the vaginal route is contra-indicated, because of the impossibility of carrying out a sufficiently radical operation. Therefore when such tumours are found, it will be necessary to abandon the vaginal route and to open the peritoneal cavity from above.

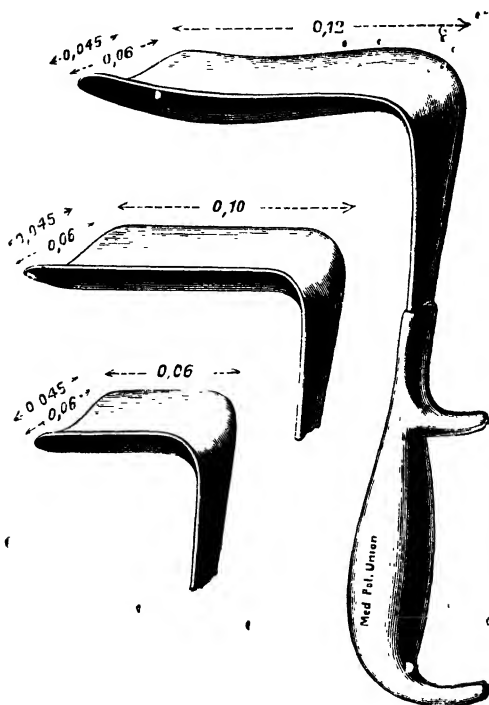


FIG. 229.—Doyen's posterior speculum.

- (5) It is not possible to deal with uterine, adnexal, or intestinal adhesions with as great facility and exactitude, and to leave the pelvis in as near an approach to its normal condition, as can be done by abdominal cœliotomy.

Indications.—There is a positive indication under all conditions for the adoption of the vaginal route for the following operations:—

- (1) The drainage of an abscess in Douglas' pouch or in the parametric tissues.
 - (2) The drainage of a pyosalpinx or ovarian abscess, if there is reason to believe that active infection is present.
- In these cases there is no doubt that the vaginal route is less

dangerous, as by it is possible to avoid the dissemination of sepsis through the peritoneal cavity.

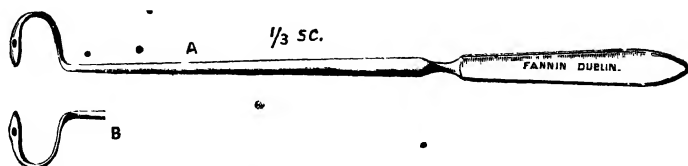


FIG. 230.—Blunt pedicle needle. A. Left-handed needle. B. Right-handed needle.

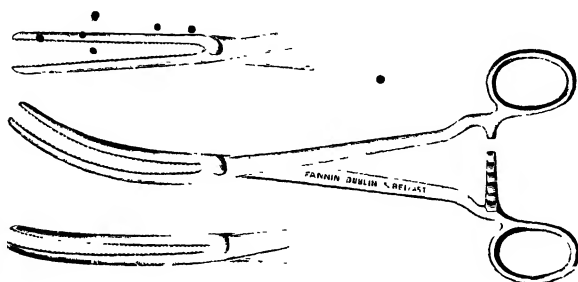


FIG. 231.—Pean's hysterectomy forceps. One-third scale. The highest forceps is straight, the middle curved on the side, the lowest curved on the flat.



FIG. 232.—Fistula forceps, useful for holding peritoneal flaps, etc. About one-fourth scale.

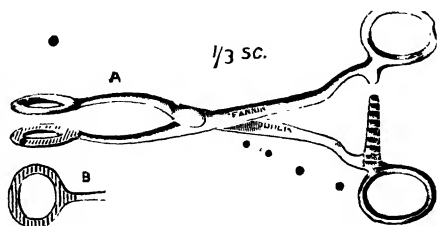


FIG. 233.—Doyen's ovary extraction forceps.

There is a relative indication for the adoption of the vaginal route for certain operations under the following conditions :—

- (1) If the vagina is sufficiently capacious to permit the necessary manipulations, and if the cervix can be drawn down at least as far as the orifice of the vagina. Thus, a multipara is always a more suitable subject than a nullipara.

- (2) If the tumour is benign and of such a size, or capable of being so reduced in size, that it can be easily brought through the vaginal opening, and if it has no attachment above the pelvic brim.

Under such conditions, the vaginal route is thought by some operators to be indicated for the following operations:—

- (1) The removal of myomata or uncomplicated ovarian tumours of small size.

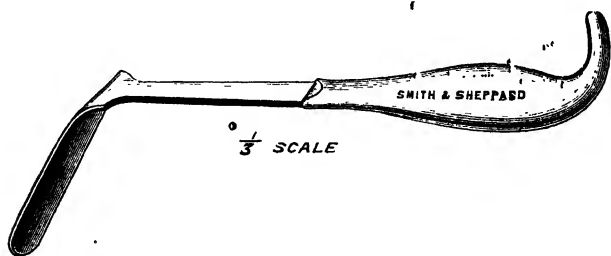


FIG. 234.—Doyen's anterior vaginal retractor

- (2) Conservative operations on the ovaries or Fallopian tubes in certain cases.
 (3) The performance of hysteropexy in certain cases.
 (4) The performance of hysterectomy in certain cases.

Posterior colpotomy is more suitable than uterine colpotomy in the case of fluid accumulations or inflamed adherent appendages in

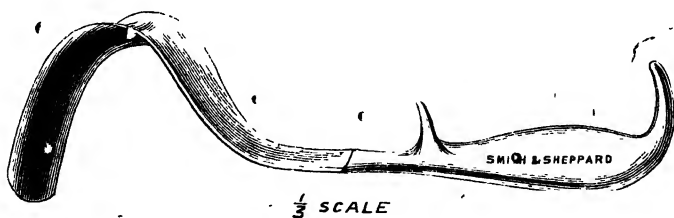


FIG. 235.—Segond's double-curve anterior vaginal retractor.

Douglas' pouch, or for the removal of tumours growing from the posterior uterine wall.

Anterior colpotomy is more suitable for the removal of tumours growing from the anterior uterine wall and of small ovarian cysts, for hysteropexy, and for conservative operations on the appendages.

Instruments.—The following instruments are required in all cases:—A posterior speculum, Martin's or Doyen's (v. Figs. 228, 229); four American forceps (v. Fig. 9); needle-holder (v. Fig. 221); three sizes of whole-curved needle (v. Fig. 222); silk, silkworm gut, and catgut; pedicle needles (v. Fig. 230); twelve clip forceps; three or four long

narrow-bladed clamp forceps, curved and straight (v. Fig. 231); four light and long-handled forceps with short blades (v. Fig. 208); ovary forceps (v. Fig. 233); two lateral vaginal retractors, and an anterior retractor or *écarteur* (v. Figs. 234, 235); uterine sound; metal catheter; several pairs of scissors, including a pair with blunt

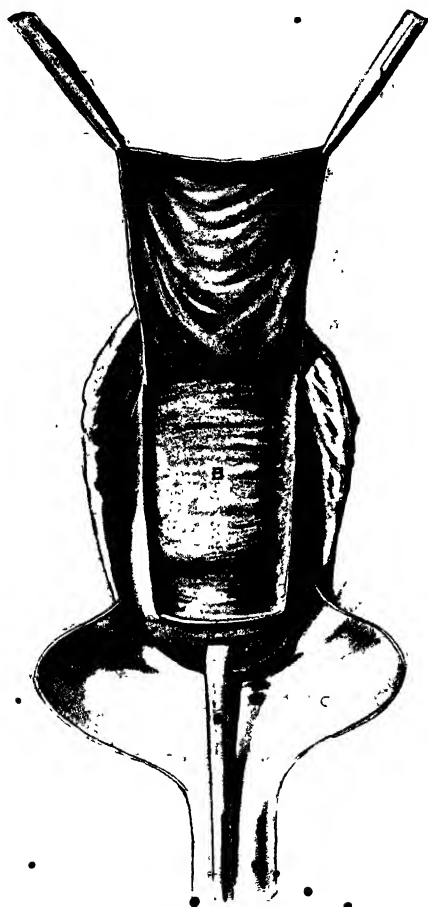


FIG. 236.—Anterior vaginal coliotomy. A flap of the anterior vaginal mucous membrane has been lifted and the bladder exposed.

ends, a sharp-pointed pair with medium length handles and tolerably stoutly made, and two pairs with long handles, one straight, the other curved on the flat; any form of sponge-holder, and two or three dozen sterilised muslin sponges; two scalpels; toothed dissecting forceps (v. Fig. 224).

Anterior Colpotomy.—A posterior speculum is passed, and the anterior lip of the cervix seized in one of two American forceps and

drawn downwards and backwards as far as possible. A sound or metal catheter is then passed into the bladder, and pushed gently in the direction of the cervix in order to ascertain how far down the cervix the bladder extends. The mucous membrane of the anterior vaginal wall is seized in another forceps a little behind the orifice of the urethra,



FIG. 237.—Anterior vaginal cœliotomy; second step. The bladder is being pushed up. B. Bladder.

and both forceps are given to an assistant to hold. By drawing the one upwards and the other downwards, the mucous membrane between the forceps is made tense. An incision is next made in the middle line, extending from half an inch below the upper forceps to just below the point to which the bladder had been found to extend. If, as sometimes happens, the bladder does not come on to the cervix at all, the incision ends about half an inch from the tip of the cervix.

Care must be taken that the incision goes completely through the thickness of the mucous membrane, but no further. A second incision is next made across the cervical end of the first, at right angles to and bisected by it, and about three-quarters of an inch in length. The mucous membrane at one side of the vertical incision is then caught in a toothed dissecting forceps and reflected outwards for

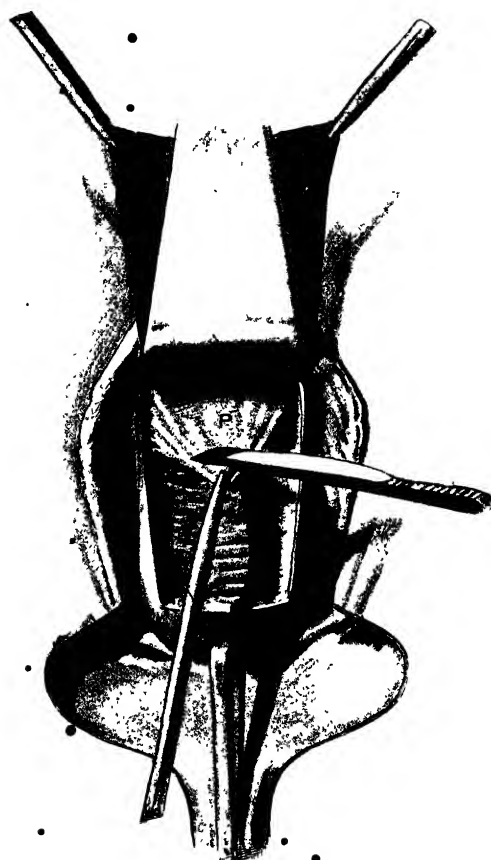


FIG. 238.—Anterior vaginal colpotomy; third step. The bladder has been pushed upwards, and the vesico-uterine peritoneal reflection exposed ready to incise.
• P. Peritoneum.

about an inch, and similarly at the other side. This can be begun with the sharp end of the scalpel, but as we get further out it is best to use the blunt end only.

Another method of exposing the bladder that possesses some advantages is as follows:—Instead of making a single vertical incision as has been described, two incisions are made, one at each side of the middle line, and about an inch to an inch and a half apart. They

begin just at the base of the anterior vaginal wall, and run down to the anterior utero-vaginal junction, at which place they are connected by a transverse incision. A flap of vaginal mucous membrane is thus marked out, and may be dissected off the bladder, and drawn forward out of the way (v. Fig. 236). The outline of the bladder can now be clearly seen, and the extent to which it comes down on the cervix can be ascertained. A transverse incision is then made through the areolar tissue just below the cervical attachment of the bladder. This incision should extend down to but not into the cervical tissue, as its object is to open up the loose tissue that lies between the bladder and cervix.

The operator then holds the lower bullet forceps in his left hand, and, with the fore and middle finger of his right hand, pushes the bladder gently upwards, at first at the centre and then at the sides (v. Fig. 237). This pushing must always be done with the pulp of the finger pressing upon the cervical tissue, as by so doing there is not the same direct pressure on the bladder, and the risk of wounding its wall is lessened. Care must be taken to detach and push up the bladder not only in the middle line but also at the sides, as in this way the ureters, as well as the bladder, are separated from the neighbourhood of the uterus and carried upwards out of harm's way. There is usually a firm bond of attachment between the bladder and the cervix at each side of the middle line, and this may require to be divided with scissors.

As soon as the bladder has been pushed off the uterus, the next step is to find the line of peritoneal reflection off the anterior wall of the uterus (v. Fig. 238). We can usually tell when we have got above this fold by noting the manner in which the tissues at the base of the wound glide freely over the uterine wall, when rubbed by the finger. This gliding is permitted by the fact that two layers of smooth peritoneum are in contact. It can be simulated by the bladder walls, which will also glide over one another if they have not been pushed up out of reach. In order to distinguish between the two, it is usually necessary to pass a catheter into the bladder; if the bladder is still attached to the uterus, the catheter will be felt under the fingers, but if the bladder has been pushed up and there is nothing but peritoneum, the catheter will lie above the fingers.

As soon as the peritoneum is recognised, it must be opened. To do this, catch a fold of it between two clip forceps and cut between them with a blunt-pointed scissors. First one, and then two fingers are passed through the opening thus made, which is increased in size to the extent required. A general idea of the condition of the pelvis can be now obtained by making a bimanual examination with one finger introduced through the opening.

In many cases, the next step consists in drawing out the fundus of

- the uterus, in order to examine its condition. To accomplish this, the
- body of the uterus is caught with an American forceps, or with a small and long-handled hook, as high as can be reached in the middle line,
- and then drawn downwards. Another forceps or hook is then applied as high above the former as possible, the forceps upon the cervix is removed, and the cervix itself is pushed upwards and backwards into

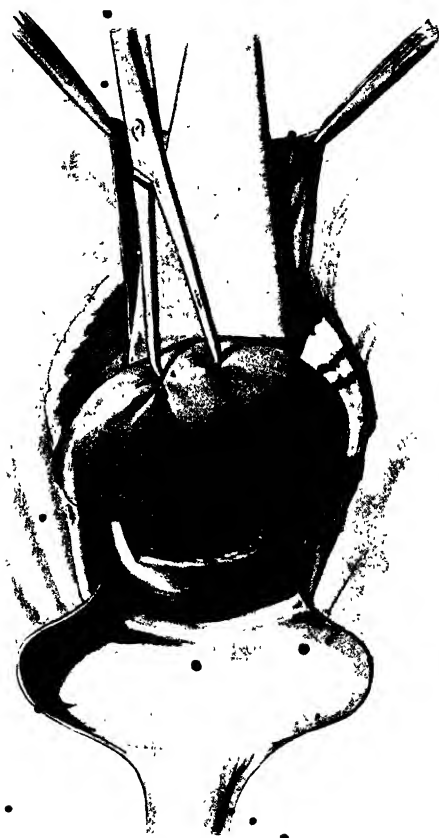


FIG. 239.—Anterior vaginal coliotomy; fourth step. The fundus has been drawn down through the opening in the peritoneum. The cervix has been allowed to fall back into the vaginal vault.

the posterior fornix. As a rule, by drawing on the second forceps the fundus can be brought out through the opening in the vaginal wall (v. Fig. 239), but, if it does not come readily, another forceps must be applied higher up. In some cases, where the uterus is very soft, a forceps thus applied will tear out instead of drawing the fundus down. To obviate this accident, which may give rise to troublesome hæmorrhage, sutures of medium-sized silk or catgut are inserted

transversely into the uterine tissue. Each suture goes in deeply enough to obtain a firm hold, and, as in the case of the forceps, they are placed one above another until one of them is sufficiently high to draw the fundus out. The ends of each suture are knotted together, and, as soon as the time has come to push the uterus back again, they are removed.



FIG. 240.—Anterior vaginal cœliotomy. The fundus of the uterus has been drawn down as far as possible, in order to bring down also a small tumour of the right ovary. O.T. Ovarian tumour.

If we only want to examine the appendages, it is unnecessary to extrovert the fundus. In such cases, the latter is caught with a forceps or hook, and drawn over to the side opposite to that on which we desire to expose the appendages. This brings the cornu of the uterus into view, and the origin of the tube and the ovarian ligament can be seen. The tube can be drawn out with a forceps, and the ovary by catching and pulling upon the ovarian ligament. If the large size of the uterus, or any other reason, renders it impossible to

- expose the ovarian ligament, pass a finger up behind the broad ligament and inside the ovary. This ligament can thus be hooked down into the vagina and the ovarian ligament or the ovary itself rendered
- visible. If the ovary cannot be exposed by this means, the fundus of the uterus must be extroverted into the vagina. The ovarian ligament can then be seen and be caught with a forceps. As soon as this is done, the fundus is replaced, and the ovary brought down by drawing



FIG. 241.—Anterior vaginal colpotomy; final step. The vaginal wound sutured. Uterine fixation sutures also in place.

on its ligament. If the ovary is enlarged, or if its pedicle is short, it will be necessary to catch it in a forceps. A special forceps is made for this purpose, and is so shaped as to prevent undue pressure upon the ovary (v. Fig. 233).

As soon as the object for which the peritoneal cavity was opened has been effected, and all the blood, etc., has been removed by means of gauze sponges, the next and final step consists in closing the peritoneal and the vaginal openings. The fundus is pushed back into the peritoneal cavity, a forceps re-applied to the cervix, which is

then drawn down, and the peritoneum closed by a continuous catgut suture. Last of all, the vaginal wound is closed, also by a continuous catgut suture, which begins at the urethral end of the wound, and gradually travels to the cervical end. At first it only includes the vaginal flaps, but, as the level of the cervix is reached from which the bladder has been stripped, a portion of the cervical tissue is also included in the stitch. As the end of the wound is reached,

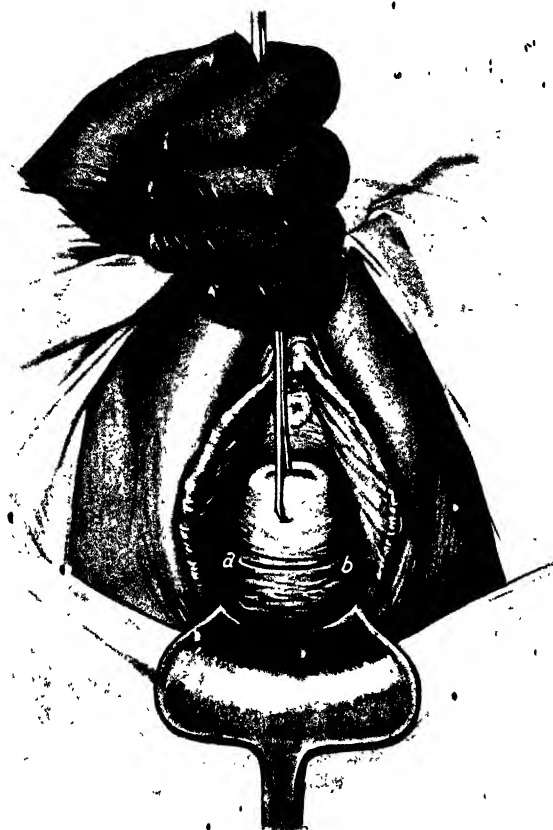


FIG. 242.—Posterior vaginal cœliotomy. The incision.

care must be taken to suture it in such a manner as to restore its original shape. For this reason, the last few sutures must be passed vertically through the edges of the transverse incision, in such a manner as to close the latter. If a vaginal flap has been raised in the first instance, it must be carefully sutured back in place (v. Fig. 241).

Posterior Colpotomy.—A posterior speculum is introduced, and the posterior lip of the cervix is seized in a bullet forceps, and drawn

downwards and forwards. A transverse incision is then made through the mucous membrane just above the junction of the posterior fornix and the cervix (*v.* Fig. 242). If a finger is passed into the opening thus made, the peritoneum will be found between the finger and the uterus, and will be recognised by noting the manner in which it glides over the uterus. Care must be taken to avoid pushing the peritoneum upwards in front of the finger. A fold of peritoneum is then caught between two clip-forceps, and a small opening made in it with a blunt-pointed scissors. Two fingers are passed through this opening, and the wound enlarged by gradually dilating it with them until it will admit three or four fingers. The pelvis can then be explored by the fingers, and the uterus and the appendages drawn down and examined. If the original incision does not give sufficient room, a vertical incision must be made at right angles to the transverse incision, and about an inch to an inch and a half in length. When making it, care must be taken to avoid injuring the rectum. The wound is finally closed by means of a catgut suture, which includes both mucous membrane and peritoneum.

Complications.—The most frequent complication of these operations is the wounding of the bladder or rectum. The bladder may be wounded during the performance of an anterior colpotomy by the first incision, or while separating the bladder from the cervix, or during the removal of a tumour. The method of avoiding the first two has been mentioned, and the last can be best prevented by the use of an anterior retractor or *écarteur* while any cutting operation is going on. Similarly, the rectum may be wounded in the course of a posterior colpotomy, either when making the vaginal incision or when opening into the peritoneal cavity.

After-treatment.—A loose tampon of iodoform gauze is placed in the vagina. The catheter is passed every six or eight hours if necessary. The tampon may be removed on the evening of the day following the operation, and purgative medicine may be given the same evening. The date at which the patient is allowed to get up depends on the nature of the operation which has been performed.

CHAPTER II.

MAJOR OPERATIONS ON THE UTERUS.

Hysterectomy: Ventral Hysterectomy: Partial Hysterectomy: Total Hysterectomy:
for Non-Malignant Conditions; for Malignant Conditions: Vaginal Hysterectomy.

HYSTERECTOMY.

THE term hysterectomy (*ὑστέρα*, the womb; *ἐκτομή*, a cutting out) is applied to all operations for the removal of the body of the uterus or of the whole uterus, with or without the accompanying removal of the tubes and ovaries. The following table shows the various forms of hysterectomy which are performed:—

Hysterectomy	Ventral	Partial.	For non-malignant conditions.
		Total	
	Vaginal (always total).		For malignant disease.

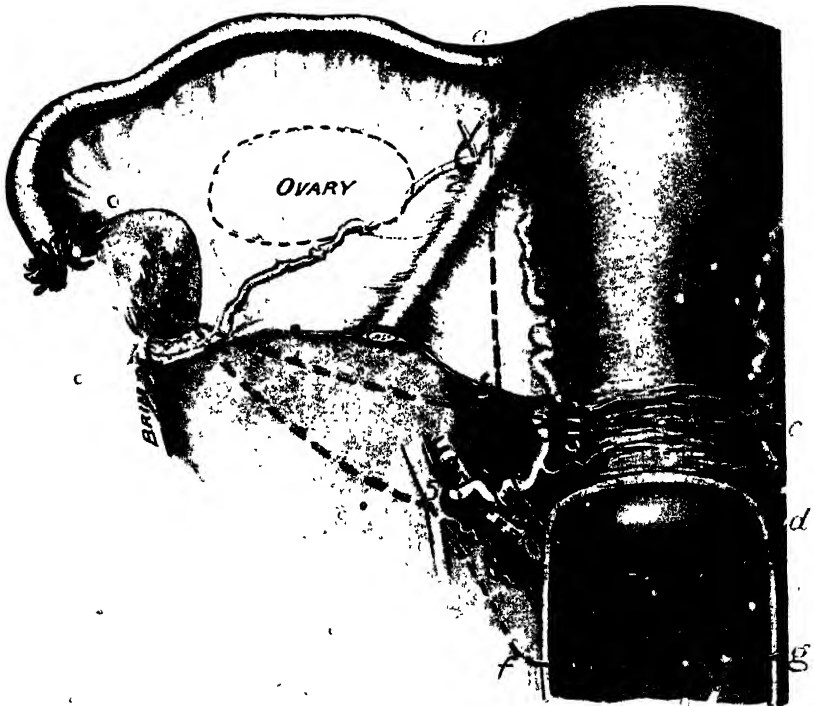


FIG. 243.—The blood supply of the uterus and broad ligament to show the points of control of the arteries, and the lines of incision followed in the different forms of hysterectomy. *a, b, c*. Incision in supra-vaginal hysterectomy. *a, b, d*. Incision in complete hysterectomy—non-malignant conditions. *e, b, c*. Incision in supra-vaginal hysterectomy with complete removal of the broad ligament. *e, b, d*. Incision in complete hysterectomy with complete removal of the broad ligament. *e, f, g*. Incision in Wertheim's hysterectomy for malignant conditions.

Indications.—The general indications for hysterectomy are as follows :—

- (1) Benign tumours of the uterus, in which it is impossible to remove the tumour and to leave the uterus.
- (2) All cases of malignant disease of the uterus.
- (3) Many cases of malignant disease of the appendages.
- (4) Certain cases of infection of the appendages.
- (5) Certain cases of uterine tuberculosis.
- (6) Certain cases of uterine displacement.
- (7) Certain cases of intractable uterine hæmorrhage.

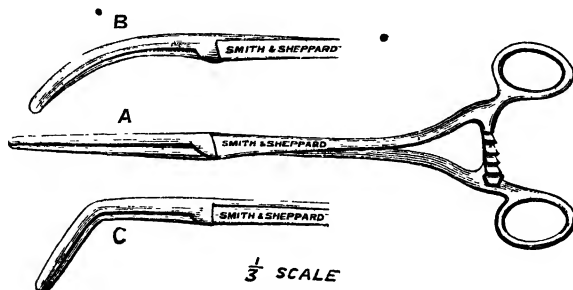


FIG. 244.—Long hysterectomy clamps. A. Straight. B. Curved. C. Elbowed.

The Selection of the Route and of the Operation.—The tendency of modern operators is undoubtedly to favour abdominal hysterectomy in the majority of cases, and to leave vaginal hysterectomy for a few cases in which it is specially suitable. The reasons for this are obvious. The abdominal operation is short and simple. In the case of benign

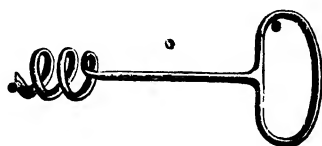


FIG. 245.—Doyen's corkscrew myoma-extractor.

tumours, it is easier to determine whether or not it is possible to save the uterus, while in malignant disease, a much freer extirpation of the surrounding tissues can be carried out. In inflammatory conditions, it is easier to leave some part of the ovaries, and indeed, in most cases, the necessity for hysterectomy can be avoided.

VENTRAL HYSTERECTOMY.

Ventral hysterectomy is the term applied to the removal of the body of the uterus or of the entire uterus through an incision in the abdominal wall.

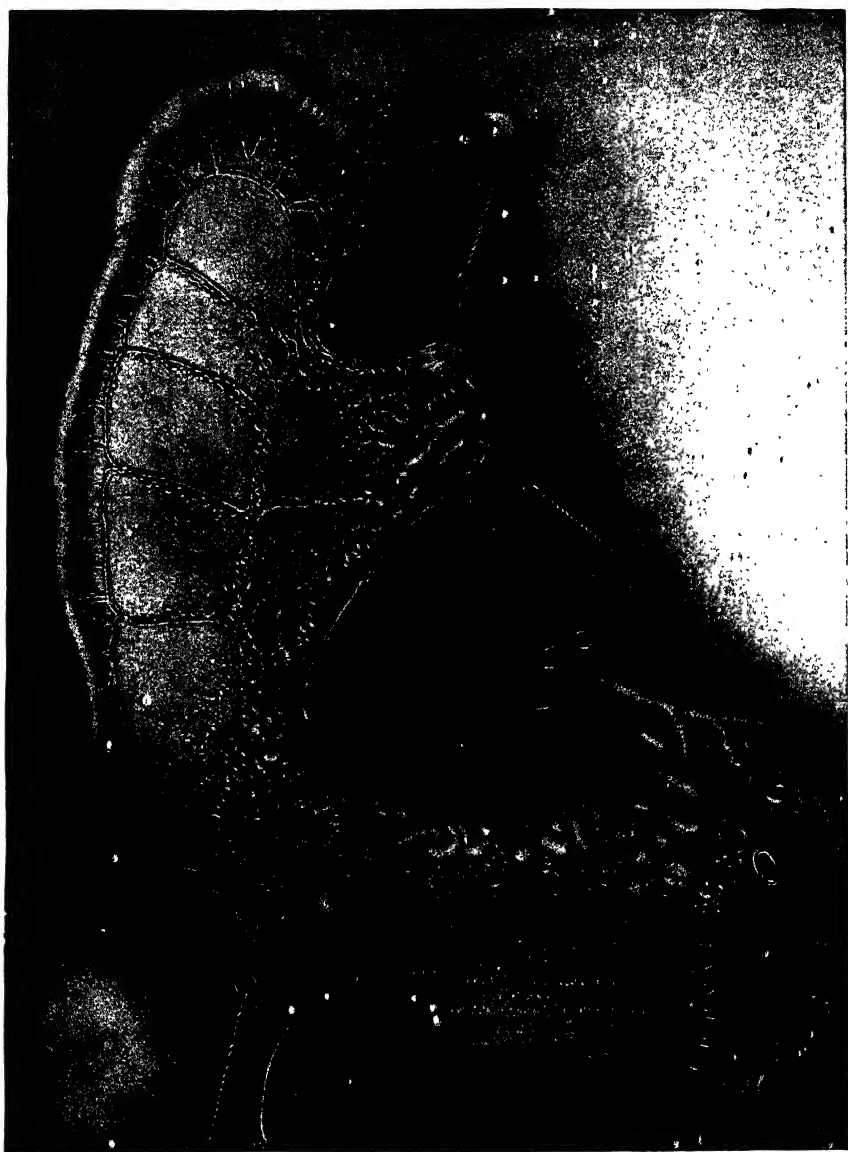


FIG. 246.—The vascular relations of the uterus, ovary, and Fallopian tube on the left side as seen from the front. The anterior leaf of peritoneum has been removed. The relations of the ureter to the uterine artery are well seen. Ur. . . Ureter. U.A. Uterine artery. U.V. Uterine vein. Ov. A. Ovarian artery. Ov. V. Ovarian vein. (*Kelly.*)

Instruments.—The following instruments are required in addition to those given under the head of Ventral Cœliotomy:—Six clamp



FIG. 247.—Abdominal hysterectomy for myoma. The finger has been pushed through the broad ligament between the ovary and the uterus.

forceps of various shapes and curvatures (v. Figs. 231, 244); four large volsella (v. Fig. 277); a large ring forceps for drawing up the uterus (v. Fig. 209), or two American forceps; some form of corkscrew myoma-extractor (v. Fig. 245).

Operations.—Two operations must be described :—Partial hysterectomy and total hysterectomy.

I. PARTIAL VENTRAL HYSTERECTOMY.—Partial ventral hysterectomy.



FIG. 248.—Abdominal hysterectomy for myoma. Both broad ligaments have been divided, and the finger has been pushed from left to right beneath the peritoneum where it passes from the anterior uterine wall on to the bladder.

tomy, or supra-vaginal amputation of the uterus, is the term applied to the removal of the body and of that part of the cervix which lies above the vaginal intiction, while the remainder of the cervix is left behind. The advantages of this operation over total hysterectomy are

that in most cases it can be performed in a shorter time, and that it does not necessitate any interference with the supports of the upper part of the vagina, or cause any alteration in its length, while the main objection which is urged against it is that in the cervix a possible source of infection or of subsequent malignant disease is left. Any



FIG. 249.—Abdominal hysterectomy for myoma. Ligature of the uterine artery on the left side.

form of partial hysterectomy is necessarily contra-indicated in malignant disease.

A simple form of partial hysterectomy is as follows:—The abdomen is opened in the usual manner, the incision being long enough to allow the uterus to be brought out through it. The patient is then placed in Trendelenburg's position. If it is possible,

the uterus is drawn out of the abdomen, and pulled over towards the right side. The finger is then pushed quickly through the broad ligament on the left side from behind forward. The exact point at which it is passed depends on the size of the broad ligament and whether it is desired to spare or to remove the ovaries. If the

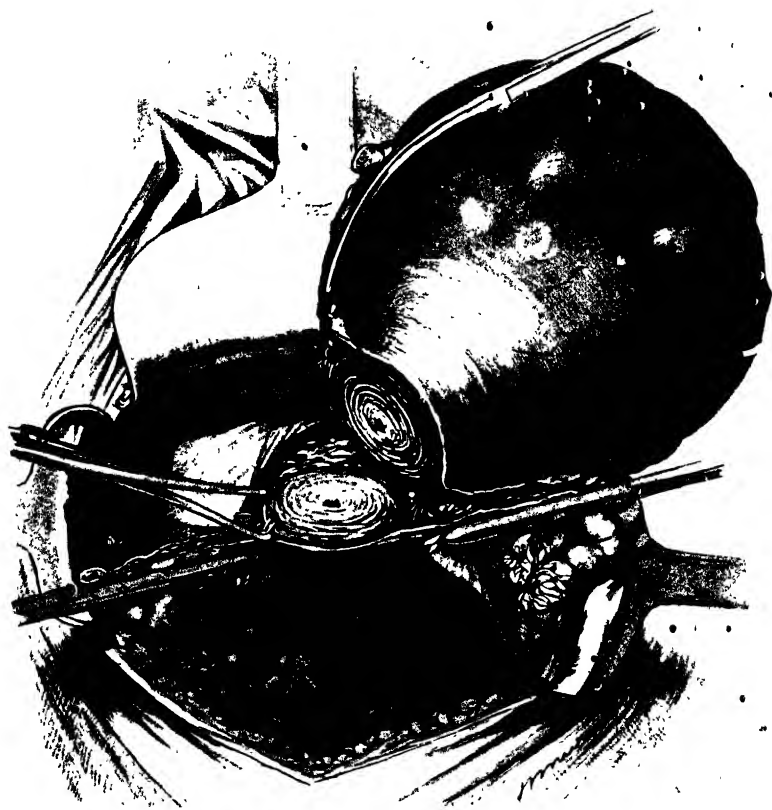


FIG. 250.—Abdominal hysterectomy for myoma. The cervix has been cut across from left to right, and the right uterine artery exposed.

ovaries are to be removed, then the finger is passed through the ligament just beneath the infundibulo-pelvic ligament.

If the ovary is to be left, the finger is passed just below the ovarian ligament and inside the ovary, either between the ovarian and round ligaments, or below the round ligament, according to the size of the broad ligament (v. Fig. 247). If the latter is deep, and the space

between the round and ovarian ligaments is considerable, it is advisable to take each of them separately, and first to pass the finger through the broad ligament, immediately below the ovarian ligament, and then, having clamped the piece of ligament above the finger and divided it, to take the round ligament separately.

The uterus is now drawn over to the left side, and the broad ligament and the round ligament on the right side are similarly isolated, clamped, and divided. The next step consists in passing the finger beneath the peritoneum just above the fundus of the bladder. At this point, the peritoneum is held only by loose bands of connective tissue, and the finger can very readily be pushed across from side to side (*v.* Fig. 248). The peritoneum is thus at once isolated from the bladder, and can quickly be divided from left to right. In most cases, if the uterus is drawn up, the bladder will retract down, but if

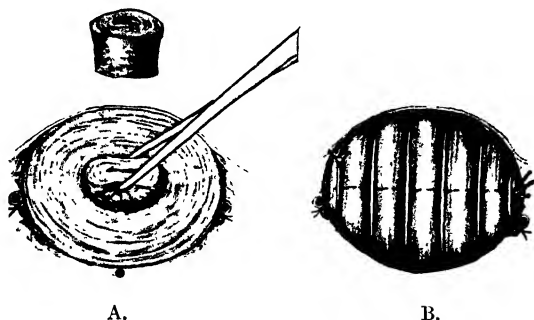


FIG. 251.—Abdominal hysterectomy for myoma. Method of dealing with the cervical stump. A. Excision of the cervical mucous membrane. B. Suture of the stump antero-posteriorly to check bleeding and close over the lower part of the cervical canal.

it does not retract sufficiently far, its fundus can be pushed down with a gauze sponge until the cervix is exposed.

The uterus is now again drawn over to the right, so as to expose the left uterine vessels, and a suture threaded on a blunt needle is passed round them, a little above the point at which they turn upwards beside the uterus (*v.* Fig. 249). If this suture is so passed as to include a small portion of cervical tissue, one will be certain to include all the vessels, and at the same time to fix the stitch in such a manner that it cannot slip. The vessels are then tied and divided. The cervix is then caught with a bullet forceps just above the divided vessels, and is cut across from left to right with a scalpel (*v.* Fig. 250). As the incision reaches the right side, great care must be taken not to continue it too far, but to stop immediately; the last few fibres of the cervix are cut across, otherwise the uterine vessels on the right will be injured, and their control rendered more troublesome. By

carrying the uterus now a little further over to the right, the uterine vessels can be seen, and may either be directly tied and cut, or else,

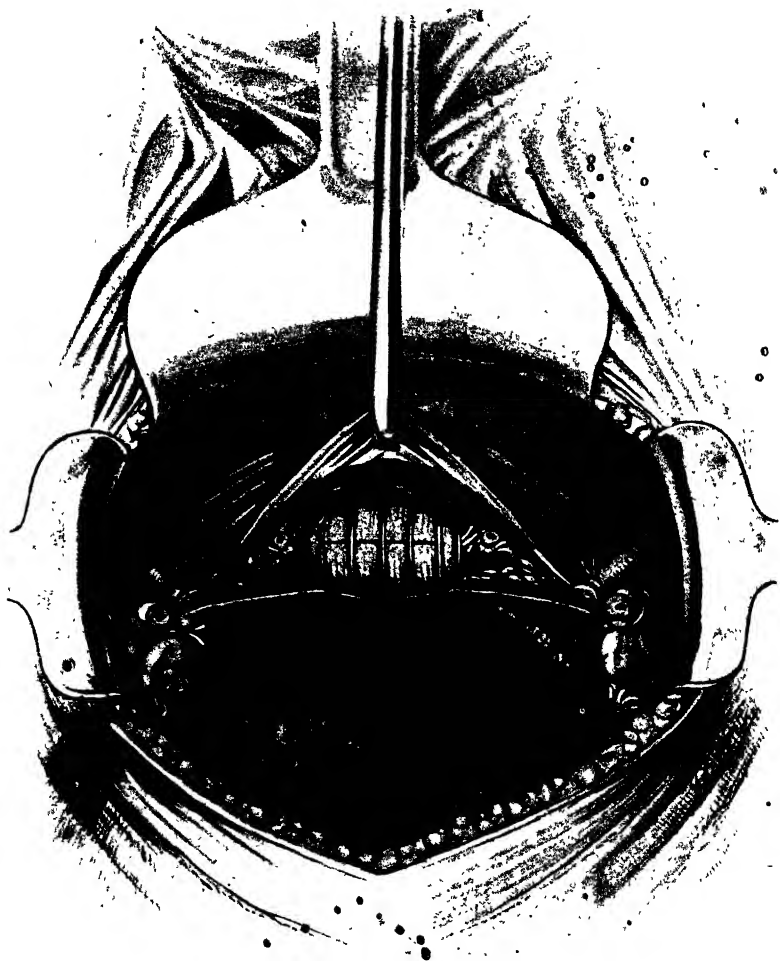


FIG. 252.—Abdominal hysterectomy for myoma. The broad ligaments on each side have been tied, and the peritoneum is ready for approximation over the exposed pelvic floor.

clamped for the moment and then tied later as soon as the uterus has been removed.

The next step consists in the excision of the mucous membrane of the upper part of the cervical canal. This is done quickly with a

- narrow-bladed knife, a cone-shaped piece being cut out of the centre of the cervix, and then the edges of the cervix are brought together from side to side by means of a continuous catgut suture (*v.* Fig. 251).
- The next step consists in replacing the clamp on the broad ligament by sutures. As a rule, two sutures on each side are sufficient. One is



FIG. 253.—Abdominal hysterectomy for myoma. The operation complete.

so placed as to include the ovarian ligament and the cut end of the Fallopian tube, while the second includes the round ligament (*v.* Fig. 252). If there are any small vessels bleeding in the parametrium between the round ligament and the uterine vessels, they must be tied separately.

The last step consists in bringing together the cut edges of the broad ligament, and the anterior and posterior flaps of peritoneum on

the cervix, by a continuous catgut suture, so as to cover the stump and all raw surface. This suture is usually passed from right to left, somewhat in the manner shown in the illustration (v. Fig. 253). Any clots lying in Douglas' pouch or over the bladder are then carefully sponged away, and the abdomen is closed in the usual manner.

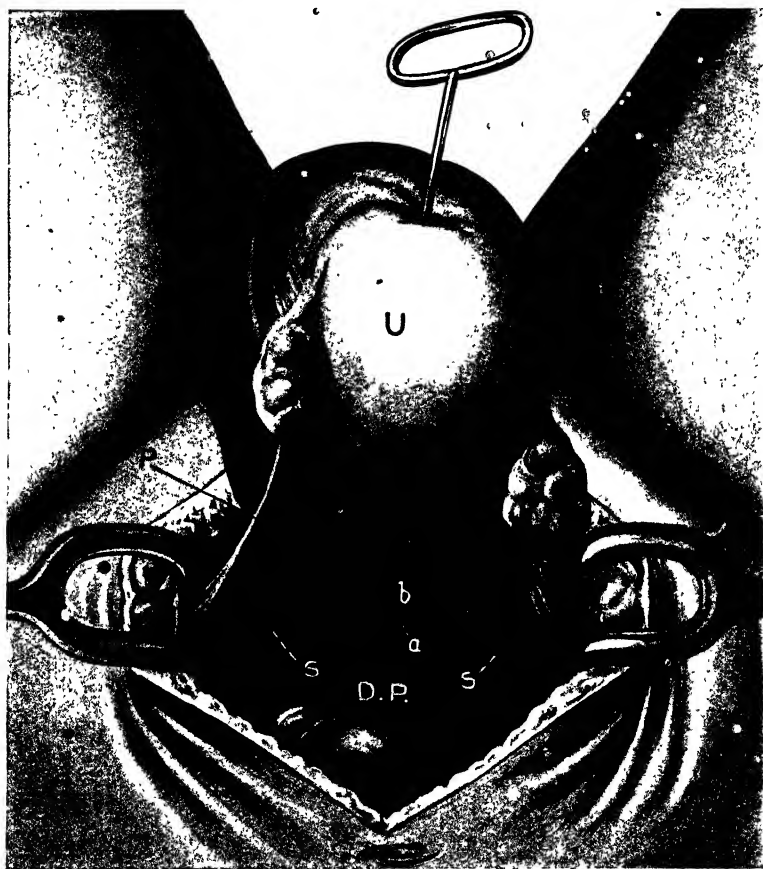


Fig. 254.—Doyen's total hysterectomy. The uterus is drawn forcibly upwards, and an incision is made from Douglas' pouch into the posterior vaginal fornix. *a.* Transverse incision. *b.* Short vertical incision. D.P. Douglas' pouch. S. Utero-sacral ligaments. P. Infundibulo-pelvic ligament. U. Uterus.

II. TOTAL VENTRAL HYSTERECTOMY.—There are two distinct methods of performing total ventral hysterectomy, one suited to non-malignant conditions, and the other to malignant conditions. The former method aims at removing the uterus alone, or the uterus and the appendages. The latter method aims at removing both the uterus and the appendages, and the entire broad ligament, and as

much of the parametric pelvic connective tissue and of the upper part of the vagina as possible. These two methods must be considered separately.

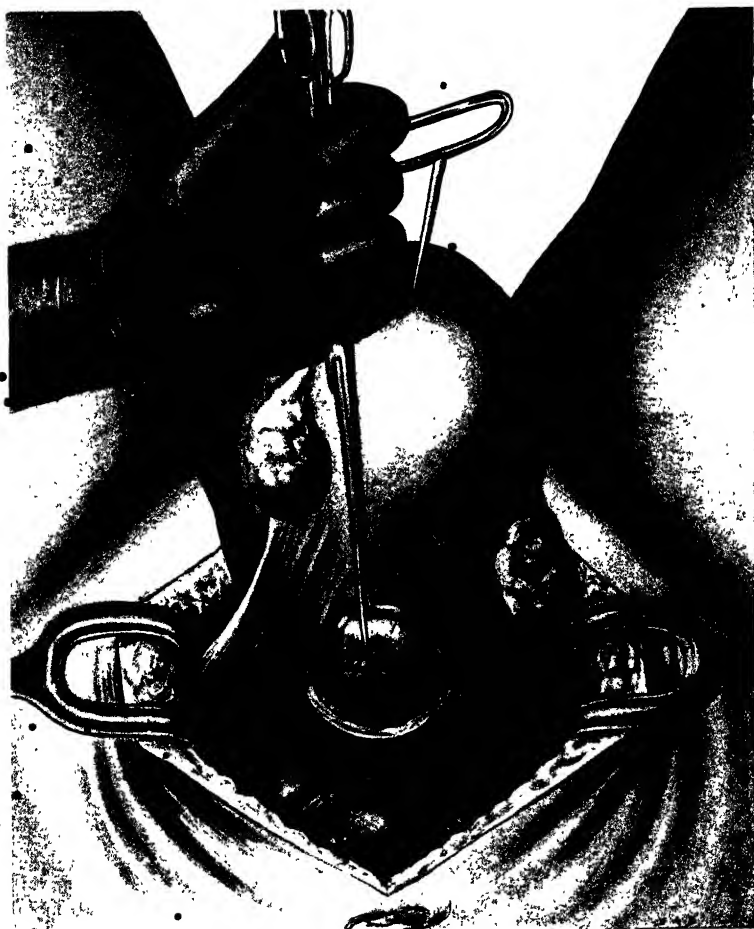


FIG. 255.—Doyen's total hysterectomy. The anterior lip of the cervix is caught with a bullet forceps, and the cervix is drawn forcibly backwards and upwards through the opening in Douglas' pouch. The anterior and lateral vaginal attachments of the cervix are then divided. *a.* Incision through vaginal mucous membrane. C. Cervix.

(A) **Total Hysterectomy for Non-malignant Conditions.**—The most suitable and quickest operation is as follows:—

As soon as the abdomen is opened, the uterus is drawn out into the wound, a corkscrew extractor (*v.* Fig. 245) is screwed into it, and an assistant pulls it down forcibly over the pubes so as to expose Douglas' pouch to the fullest extent (*v.* Fig. 254).

A long curved forceps is then passed into the posterior fornix of the vagina, and pushed upwards against the mucous membrane, in such a manner as to indicate its position beneath the peritoneum of Douglas' pouch. An opening is next made into the vagina by cutting down on the forceps with a scalpel, the forceps is

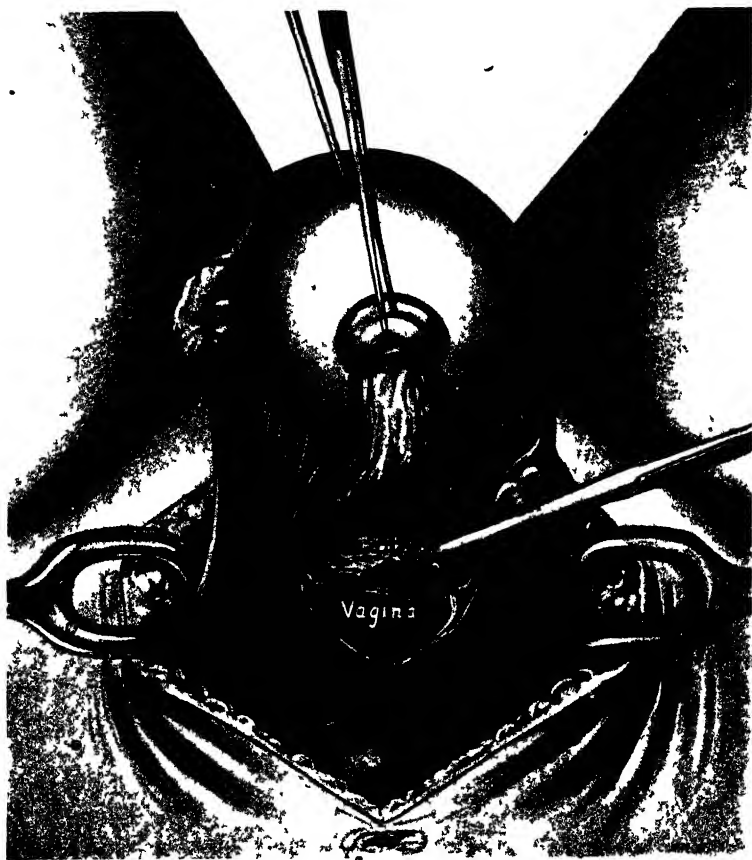


FIG. 256.—Doyen's total hysterectomy. The cervix, freed from its vaginal attachments, is drawn still further upwards, and strips itself off the bladder. U.V. Uterine vessels.

pushed through into the peritoneal cavity, and the opening enlarged by separating the blades. A silk suture is then passed through the peritoneum and the vaginal mucous membrane just below this opening, and tied, with the object of providing a tractor which will subsequently draw the posterior edge of the vaginal opening into view after the removal of the uterus. The operator then passes one finger into the vagina, and, under its guidance, the posterior, or if possible the anterior, lip of the cervix is seized in an American forceps, and

drawn forcibly upwards through the opening (*v.* Fig. 255). The anterior lip of the cervix can then be caught in a forceps, if this has not been previously possible.

The mucous membrane of the lateral fornices of the vagina, and the lateral and posterior ligamentous attachments of the uterus, are then

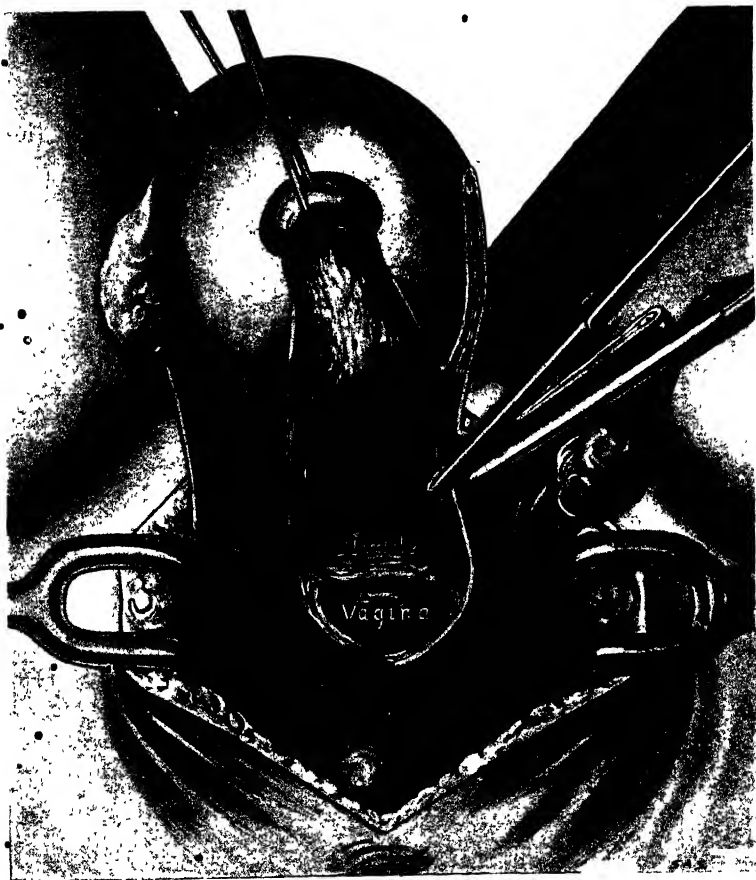


FIG. 257.—Doyen's total hysterectomy. The anterior reflection of peritoneum is incised, and the right broad ligament is clamped and divided. P. Peritoneum covering bladder.

divided with a scissors, taking care to keep as close as possible to the sides of the cervix. This permits the cervix to be drawn still further upwards and brings into view the mucous membrane of the anterior vaginal fornix, which is divided in turn, still taking care to keep as close to the cervix as possible. By pushing upwards with the finger, the connective tissue between the bladder and the uterus is then exposed, and by dragging the cervix forcibly upwards



FIG. 258.—Wertheim's hysterectomy for cancer. The isolation of the infundibulo-pelvic ligament.

with the forceps, the bladder is completely separated from the cervix (v. Fig. 256). This separation is assisted by passing the finger upwards from the vaginal opening, and is extended laterally towards the broad ligaments in such a manner as to detach a large flap of peri-

toneum. The tip of the finger is then passed through the peritoneum, and the opening thus made is extended across the surface of the uterus. By this procedure, the uterus is completely freed from its posterior and anterior attachments, and is now connected with the

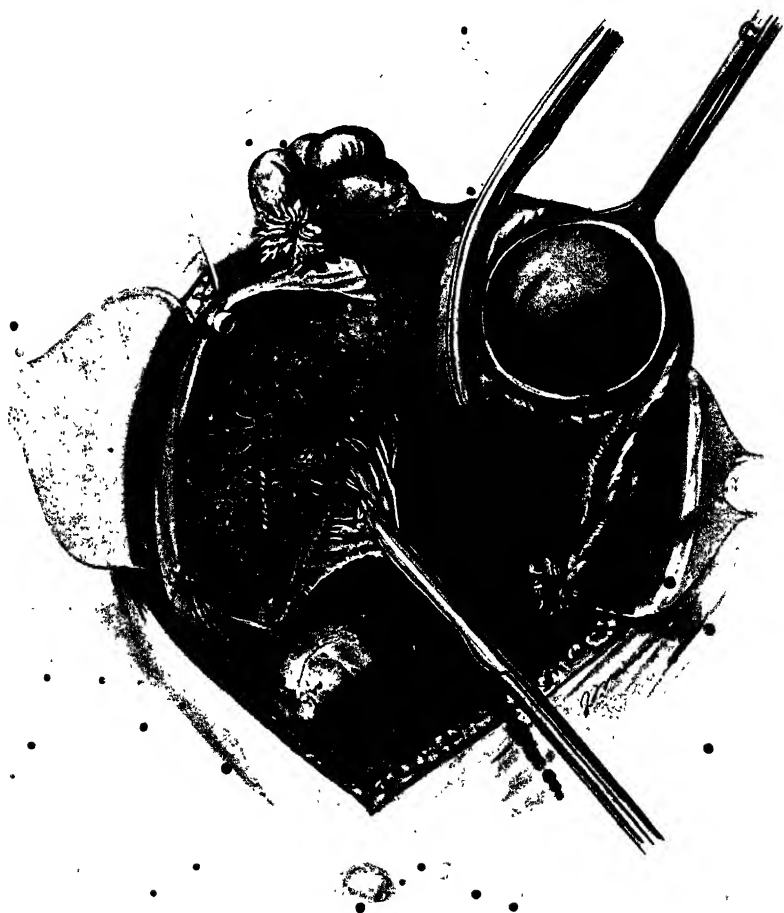


FIG. 259.—Wertheim's hysterectomy for cancer. The broad and round ligaments have been divided, and the ureter is exposed with the uterine vessels crossing it.

pelvis by the broad ligaments and the utero-sacral ligaments alone (v. Fig. 257).

The next step consists in clamping the right ligaments with a clamp applied between the ovary and the uterus, and in cutting through them (v. Fig. 257). The uterus is then drawn over to the right side, the left ligaments are similarly clamped and

divided, and the uterus is removed. Two clamps will be required on each side, one on the uterine vessels and the other on the ovarian vessels and the round ligament.



FIG. 260.—Wertheim's hysterectomy for cancer. The finger is passed under the uterine vessels, and lifts them up off the underlying ureter.

The uterus being now removed, the next step consists in replacing the clamps by ligatures, and in removing the appendages if necessary. In simple cases, two sutures on each side are sufficient. One of these

is passed through the broad ligament and is tied to the inner side of the ovary, while the second is placed on the uterine vessels. The clamps are then removed one by one, and any vessels which are still bleeding are picked up and tied. Small vessels will sometimes be



FIG. 261.—Wertheim's hysterectomy for cancer. The ureters have been exposed and isolated at each side, and the bladder has been separated from the uterus and the vagina.

found in the parametric tissue between the peritoneum and the vaginal mucous membrane.

As soon as all bleeding points have been tied, the posterior edge of the vaginal opening is drawn into view by means of the silk suture which was passed through it at the beginning of the operation, and the vaginal mucous membrane surrounding the wound is caught with

forceps in two or three places and brought into view. Its edges are then brought together with a continuous catgut suture and the opening,

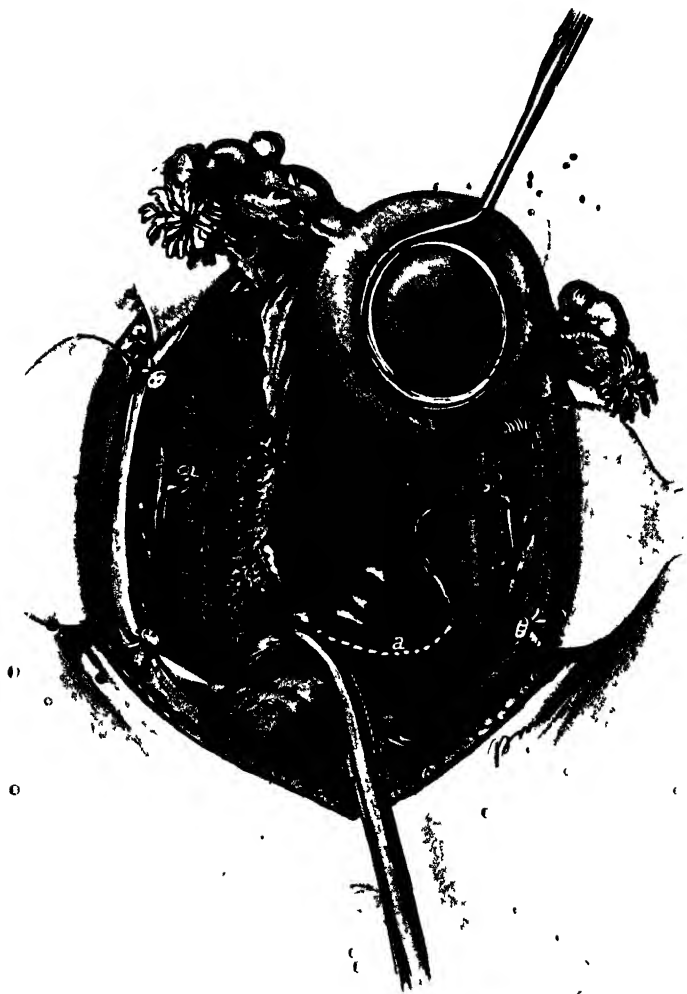


FIG. 262.—Wertheim's hysterectomy for cancer. The uterus is drawn forwards and the utero-sacral ligaments are divided, followed by the division of the upper part of the vaginal suspensory ligaments. 'a.' Line of incision of peritoneum of Douglas' pouch.

thus closed. It is always advisable to suture the divided ends of the utero-sacral and the round ligaments to the vaginal wall, so as to give all possible support to the vaginal vault.

The final step consists in bringing together the divided edges of the

broad ligament, and of the anterior and posterior flaps of peritoneum, in such a manner as to bring the ovaries into a suitable position and to cover the vaginal opening (*v.* Fig. 253).

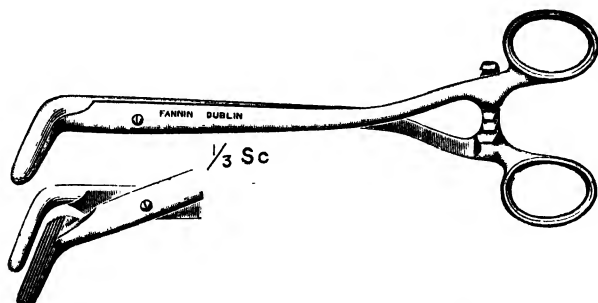
(B) **Total Hysterectomy for Malignant Conditions.**—The object of all operations that come under this heading is to remove the uterus and the adjacent tissues as completely as possible without endangering the safety of neighbouring organs.

The operation most usually adopted is as follows:—The vertical mesial incision is usually the best in these cases, but occasionally, where the patient is very stout, Pfannenstiël's incision may be preferable. As soon as the abdomen is opened, the patient is placed in the Trendelenburg position, and the intestines are pushed well upwards out of the field of operation, being protected there by two or three large pieces of gauze wrung out of hot saline solution. The uterus is then caught with a large ring forceps (*v.* Fig. 258), and drawn upwards and out of the abdomen, the field of operation being better exposed by means of retractors. The uterus is then drawn to the right, and the operator passes his finger beneath the vessels in the left infundibulo-pelvic ligament, so as to isolate them from the underlying structures (*v.* Fig. 258). These vessels are tied on the proximal side and clamped on the uterine side, and the ligament is divided. The round ligament is then similarly treated, being tied as far out as possible. Then with the scissors the anterior and posterior peritoneal leaves of the broad ligament are cut across, keeping as low as possible, and continuing the incision right up to the uterine vessels. In dividing the posterior leaf, care must be taken not to cut below the actual broad ligament, as the incision would then be dangerously near the ureter.

In this manner, the entire broad ligament is separated from its base, and a triangular area of connective tissue is exposed.

If the posterior peritoneal edge of this area is now caught in a light clamp forceps and drawn upwards, so as to expose the underlying surface, the ureter can almost at once be seen (*v.* Fig. 259). It is buried in the fat and connective tissue, and is adherent to the posterior leaf of peritoneum. A little blunt dissection with the end of a clamp exposes the whole length of ureter as it crosses the base of the broad ligament up to the point at which it passes beneath the uterine vessels. The finger is then pushed along the ureter from behind forwards in the direction of the bladder, and keeping immediately above it (*v.* Fig. 260). In this manner the finger is passed between the uterine vessels and the ureter, and the former can be directly lifted off the latter. The vessels are then traced outwards in the direction of the internal iliac artery, and are tied as near this artery as possible. They are also clamped on the uterine side and then cut across.

All the foregoing steps are then repeated on the right side, the body of the uterus being drawn over to the left, and, as soon as the uterine artery on that side has been tied and divided, the peritoneum over the top of the bladder is cut from side to side. It is readily separated from the bladder by passing the finger beneath it, so that the muscle of the fundus of the bladder cannot be injured. The bladder is then pushed down off the front of the uterus and off the upper part of the vagina. When there is extensive involvement of the anterior vaginal walls by the malignant disease, there will be considerable difficulty in carrying out this step, because the bladder wall may be so permeated by the cancer that it will tear during separation. In such cases, where the bladder tears, or where a piece of it is involved in a cancerous extension, the involved piece must be cut



• FIG. 263.—Wertheim's right-angled clamp with long jaws for closing the vagina.

out, and the opening in the bladder closed by two layers of continuous catgut suture.

As soon as the separation of the bladder is complete, the ureter on each side must be traced along the side of the vagina as it passes into the bladder, and must be separated from the lateral vaginal wall (v. Fig. 261). Here again difficulty often arises, as outgrowths of cancer frequently spread laterally, so as to involve the ureters, which may even be found passing directly through a cancerous mass. Such cases are very unsatisfactory.

As soon as the ureters have been isolated right up to the bladder, any portions of the latter which still adhere to the upper part of the vaginal walls must be separated and pushed down, and when this is done, the next step consists in dividing the remaining ligaments of the uterus and of the upper part of the vagina (v. Fig. 262). These ligaments are two in number at each side:—the utero-sacral ligaments and the suspensory ligaments of the vagina. Blood-vessels run in each of them, and consequently they must be tied or clamped prior to division. They should be clamped as far out as possible. As soon

as they have been cut, the uterus and vagina can be drawn to a greater height in the pelvis, and the upper part of the vagina will



FIG. 264.—Wertheim's hysterectomy for cancer. The uterus is drawn up and the special right-angled clamps are applied to the vagina, which is then divided below the clamps.

become more accessible. When dividing the utero-sacral ligaments, the peritoneum and the floor of Douglas' pouch lying between them must also be cut across.

The final step in separation consists in pushing the rectum downwards and backwards off the posterior vaginal walls to the necessary extent, and in separating the lateral connective tissue from the vagina. .

When the separation of the vagina has been continued downwards to the necessary extent, one large or two small right-angled clamps (v. Fig. 263) are applied to it just below the furthest point to which the



FIG. 265.—Wertheim's hysterectomy for cancer. The appearance of the pelvic floor after the uterus and upper part of the vagina have been removed.

cancerous growth extends, taking care that the clamp at its point of application is clearly and definitely below the growth (v. Fig. 264). Each side of the vaginal wall is then caught with an American forceps about half an inch below the clamps, and the vaginal wall is cut across from side to side. This done, the uterus and the clamps are removed, the clamps thus serving to prevent any discharge from the area round the cervix escaping into the peritoneal cavity during removal. As

soon as the uterus is removed, the forceps holding the vagina is drawn up, and a gauze wipe is pushed down into the vagina, so as to carry down before it any discharge lying in the vagina, and prevent its subsequent escape through the upper opening. This wipe must be removed from below at a later stage.

The next step consists in tying any bleeding vessels. As a rule, one will be found at each side of the vagina, and it can be controlled, and at the same time the size of the vaginal opening reduced, by a stitch passed through the lateral vaginal walls from side to side. Other bleeding vessels may be found in the connective tissue round the vagina, and in the anterior and the posterior vaginal walls. The end of a strip of gauze is then pushed down into the vagina, and the remainder of the roll is packed loosely over the connective tissue at the bottom of the pelvis. If there is no oozing from the connective tissue, the amount of gauze need not be great, but, if there is considerable oozing that cannot be checked in other ways, a sufficient amount of gauze to cause firm pressure on the connective tissue should be used.

The abdominal incision is then closed in the usual manner, except that it is well to pass from side to side some silkworm-gut sutures through the skin and rectal fascia, so as to supplement the catgut sutures in the fascia in case healing should be delayed.

Complications.—The principal complications, which may occur during the performance of abdominal hysterectomy, are the wounding of the bladder or the ureter, or the ligation of the latter while the uterine artery is being tied. Wounds of the bladder can generally be easily closed. An ureter which has been divided must be re-united, implanted in the bladder, or brought out through the abdominal or vaginal wall, as is found most suitable. An ureter which has sloughed after operation cannot be repaired and, the only alternatives to leaving the patient with an ureteral fistula is to extirpate the kidney of the same side or implant the ureter in the rectum. The rectal wall also may be damaged while opening into the vagina from the floor of Douglas' pouch, and the intestines may be injured during the separation of adhesions. In such cases, the tear must be immediately sutured.

VAGINAL HYSTERECTOMY.

Vaginal hysterectomy is the term applied to the removal of the uterus through the vagina. It is always total.

Instruments.—The following instruments are required in addition to those given under the head of Vaginal Coeliotomy:—Four small and four large volsella (*v.* Figs. 9 and 277); two long spring clamps (Doyen's) (*v.* Fig. 266); ten clamps of Péan's and Segond's

patterns with long, medium, and short serrated blades (*v.* Figs. 231, 267, 268).

Operation.—Vaginal hysterectomy is carried out as follows:—Both lips of the cervix are firmly caught with a strong volsellum forceps and drawn down, or, if the cervical tissue is friable, three stout silk ligatures are passed through the anterior and posterior lips so as to close the cervical canal, and at the same time afford a means of applying traction to the uterus. The operator, holding the forceps

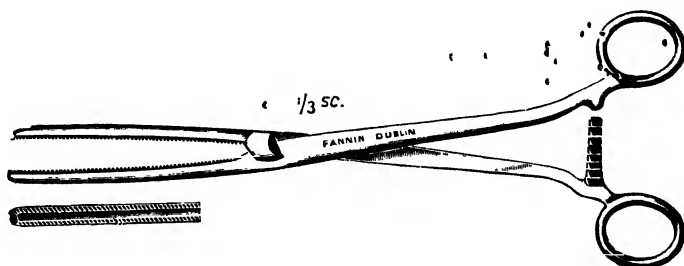


FIG. 266.—Doyen's broad ligament forceps with spring blades.

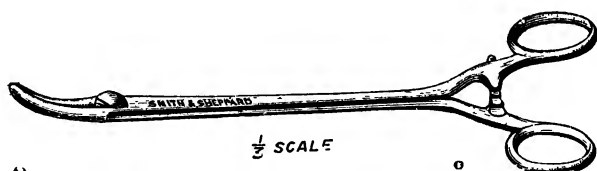


FIG. 267.—Segond's clamp forceps, curved blades.

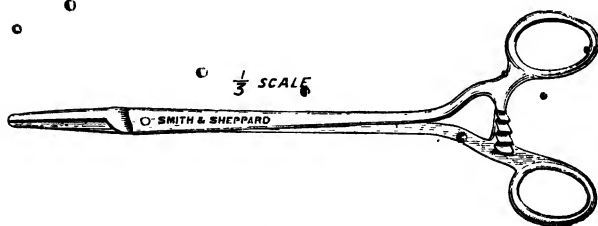


FIG. 268.—Segond's clamp forceps, straight blades.

or these sutures in one hand, incises the vaginal mucous membrane round the cervix at the level of the cervico-vaginal junction (*v.* Fig. 269).

Then, as in vaginal cœliotomy, the bladder is pushed up in front and the anterior pouch of peritoneum exposed and opened, and similarly an opening is made posteriorly into Douglas' pouch (*v.* Fig. 270). It is most important that the bladder should be pushed up not only in front, but at the sides, as by so doing the ureters are also pushed upwards and carried away from the paracervical region. In this way, the risk of subsequent injury to them is avoided.

The operator then passes a finger into Douglas' pouch and hooks down the utero-sacral ligament on one side. A ligature is passed



FIG. 269.—Vaginal hysterectomy. An incision has been made round the cervix.

round it with a needle (v. Fig. 271), and the ligament tied about half an inch or so above its insertion into the cervix and divided. The



FIG. 270.—Vaginal hysterectomy. The bladder has been pushed up, and the peritoneal reflexion exposed and opened.

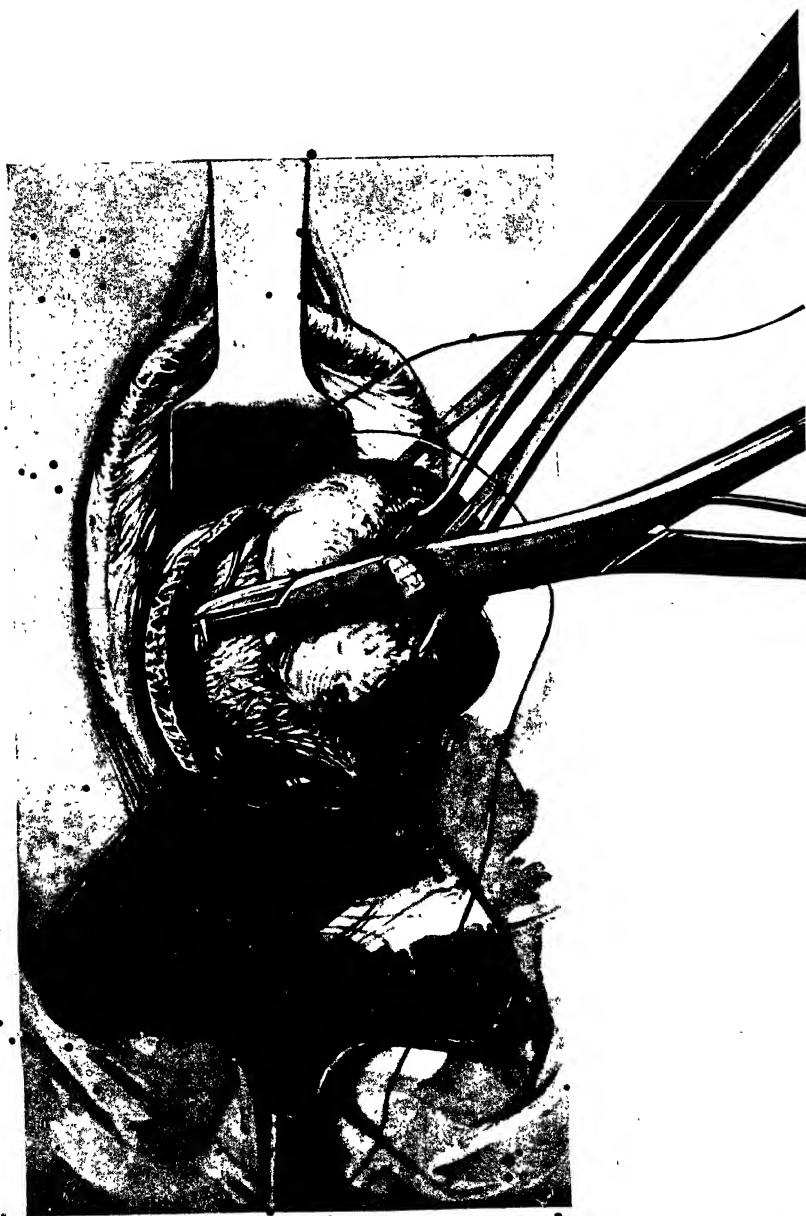


FIG. 271.—Vaginal hysterectomy. Ligature of the right utero-sacral ligament.

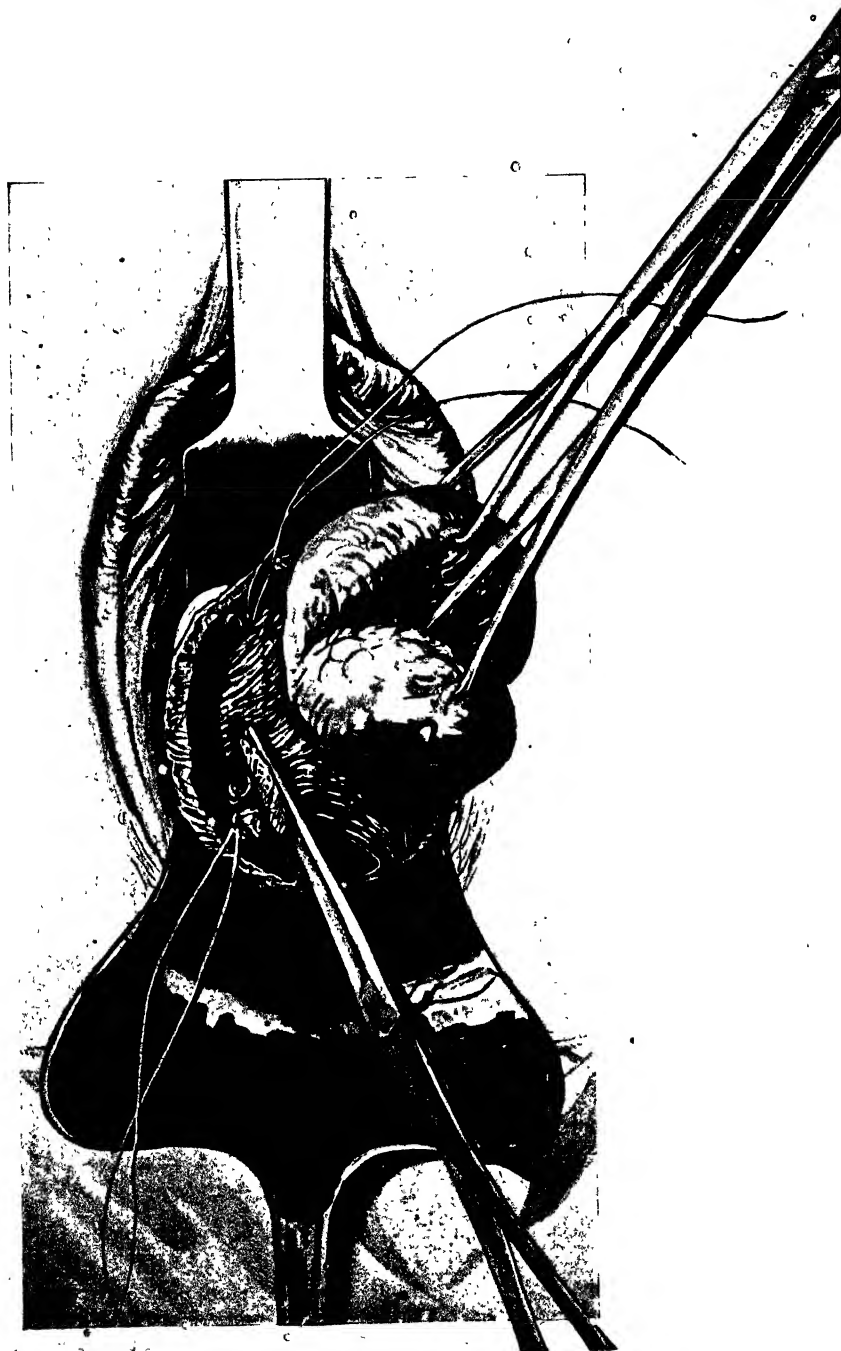


FIG. 272.—Vaginal hysterectomy. Ligature of Mackenrodt's ligament on the right side.



FIG. 273.—Vaginal hysterectomy. Ligature of the base of the broad ligament, including the uterine artery.

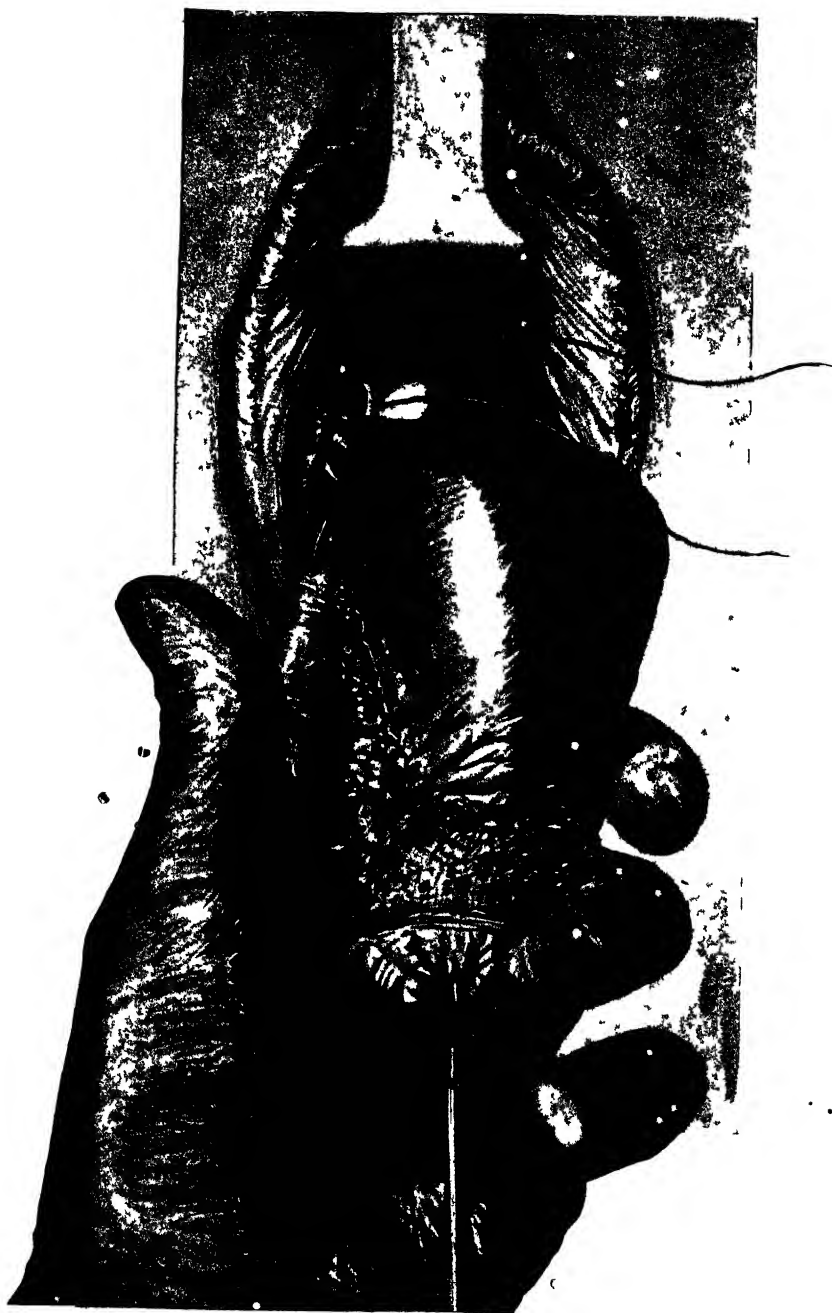


FIG. 274.—Vaginal hysterectomy. The uterus has been drawn out of the peritoneal cavity, and the upper part of the right broad ligament is being tied.

opposite ligament is then similarly treated. The cervical attachments of Mackenrodt's ligaments are then divided (*v.* Fig. 272). If they contain blood-vessels, these must be tied. The division of these two

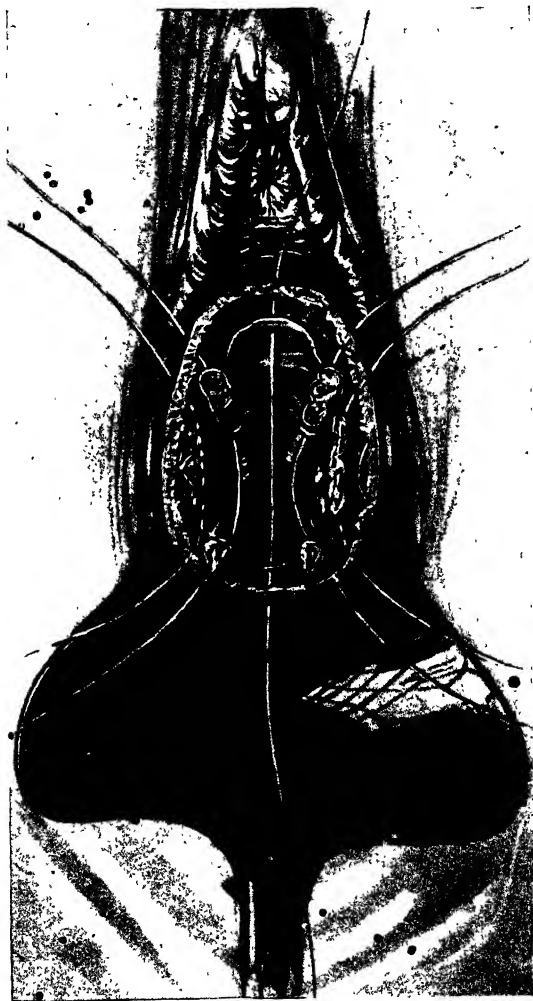


FIG. 275.—Vaginal hysterectomy. The fixation of the ends of the ligaments to the vaginal vault.

sets of ligaments materially facilitates the drawing down of the cervix, and renders the remaining steps of the operation easier.

The next step consists in exposing the uterine artery at each side, and in tying it (*v.* Fig. 273). Its exposure is usually easy after Mackenrodt's ligament has been cut. Great care must be taken to keep well to the inner side of the ureter, and to avoid injuring the

blood-vessel with the needle that carries the ligature. The vessels are then cut between the uterus and the ligature, and their distal ends are clamped.

The uterus can now be drawn further down, and if the finger is passed through the posterior opening in the peritoneum, the top of the broad ligament on the right side can be pulled down by hooking the finger over it (*v. Fig. 274*). If it is necessary to remove the ovary and the tube as well, they can be drawn down in a similar manner after first separating any adhesions which may hold them. The remaining portion of broad ligament on the right side is then tied off, with one or two sutures as necessary, and divided, the ligatures being passed to the inner or outer side of the ovary as is required. As soon as this is done, the uterus can be drawn down outside the vulva, if this has not been done already, and its remaining attachment, *i.e.* the upper half of the left broad ligament, tied and divided. If there is still any hæmorrhage, it is probably due to small vessels in the vaginal walls, or to the slipping of a ligature. As soon as it has been checked, the ligatures attached to the cut ends of the ligaments are separated, so as to correspond with the sides to which they belong, and the cut end of each broad ligament is in turn drawn down and fixed by a suture to the corresponding side of the vaginal opening (*v. Fig. 275*). If the ovaries have been removed, the ligatures on the ovarian vessels should be cut off short and not drawn down, as traction on them might cause them to slip. Finally, the anterior and posterior flaps of peritoneum are brought together by means of a few catgut sutures, and the cut edges of the vagina are similarly treated. If any pus-containing cavities are opened in the course of the operation, it is better not to close the peritoneum or vagina, but rather to plug the pelvic cavity with iodoform gauze, the ends of which are brought down into the vagina (*v. Fig. 225*).

In some cases it is easier and quicker to use clamps instead of ligatures to control the bleeding from the divided uterine attachments.

CHAPTER III.

MAJOR OPERATIONS ON THE UTERUS (*continued*).

Myomectomy and Enucleation. Hysteropexy—Ventral Suspension; Ventral Fixation; Vaginal Hysteropexy. The Interposition of the Uterus.

MYOMECTIONY.

By the term myomectomy ($\mu\upsilon\varsigma$, a muscle; $\epsilon\kappa\tau\omicron\mu\eta$, a cutting out) is meant any operation for the removal of a myoma, either pedunculated or sessile, without at the same time removing the uterus. Myomectomy can be performed in the case of submucous, interstitial, or subserous myomata, and either by the vaginal or by

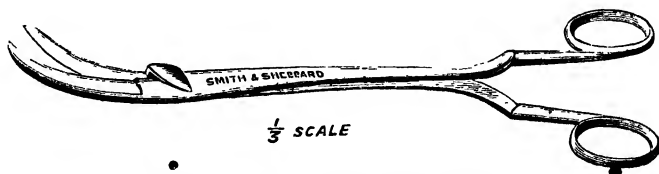


FIG. 276.—Long double-curved scissors.

the abdominal route, according to the nature of the case. Submucous myomata can, as a rule, be removed through the vagina, without opening the peritoneal cavity, but the removal of interstitial or subserous myomata requires a preliminary coeliotomy. We must, therefore, describe two different operations:—

(I.) Vaginal myomectomy, the removal of submucous myomata.

(II.) Ventral myomectomy.

Indications.—One or other of these operations is indicated according to the nature of the tumour whenever a myoma is causing such marked symptoms as to require removal, or where it is obviously increasing in size, and where its removal is possible without the performance of hysterectomy.

Instruments.—For the removal of submucous myomata the following instruments are required:—A posterior speculum, a couple of American forceps, large-sized Hegar's dilators, three or four large volsella (*v.* Fig. 277), a pair of strong blunt-pointed scissors, an uterine sound, and Schultze's spoon forceps (*v.* Fig. 278). For the removal of subserous or interstitial myomata by the vaginal or

ventral route the instruments mentioned under the head of Vaginal or Ventral Cœliotomy are required, with the addition of a pair of long double-curved scissors (v. Fig. 276).

I. VAGINAL MYOMECTOMY.—*The Removal of Submucous Myomata.*—In the case of polypi which spring from the cervix, or which have been

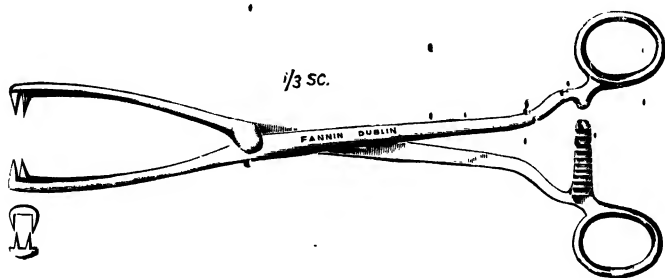


FIG. 277.—Large volsellum with strong teeth, for morcellation.

expelled from the uterus, removal is easily accomplished by taking a firm grip of the tumour with an American forceps or large volsellum and rotating it until the pedicle gives way (v. Fig. 279, B). If the pedicle is too stout to permit of this, it can be tied and divided with scissors, if it comes from the uterus; if, on the other hand, it springs

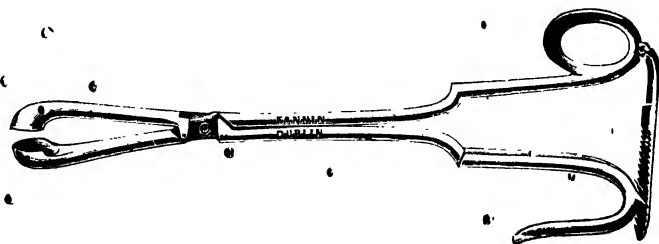


FIG. 278.—Smyly's modification of Schultze's spoon forceps for removing submucous myomata.

from the cervix, its base can be excised by a wedge-shaped incision, the edges of which are then brought together by sutures.

If the tumour lies entirely inside the uterus, the cervix must be dilated with sea-tangle tents and Hegar's dilators as has been described, until at least one finger can be passed into the uterine cavity. Then, if the tumour is pedunculated, it can be removed by twisting, in one piece if it is not too large to be brought through the cervical canal, or, if it is of large size, after cutting it up into a number of pieces.

If the tumour is sessile, but at least half of it is protruding into the uterine cavity, it can be removed by means of Schultze's spoon

forceps. To do this the cervix must be dilated as widely as possible, and then, under guidance of the finger, the forceps is introduced and a portion of the lowest part of the tumour close to its insertion into the uterus is seized and brought away, partly by the cutting action of the blades of the forceps and partly by twisting it (v. Fig. 279, A).

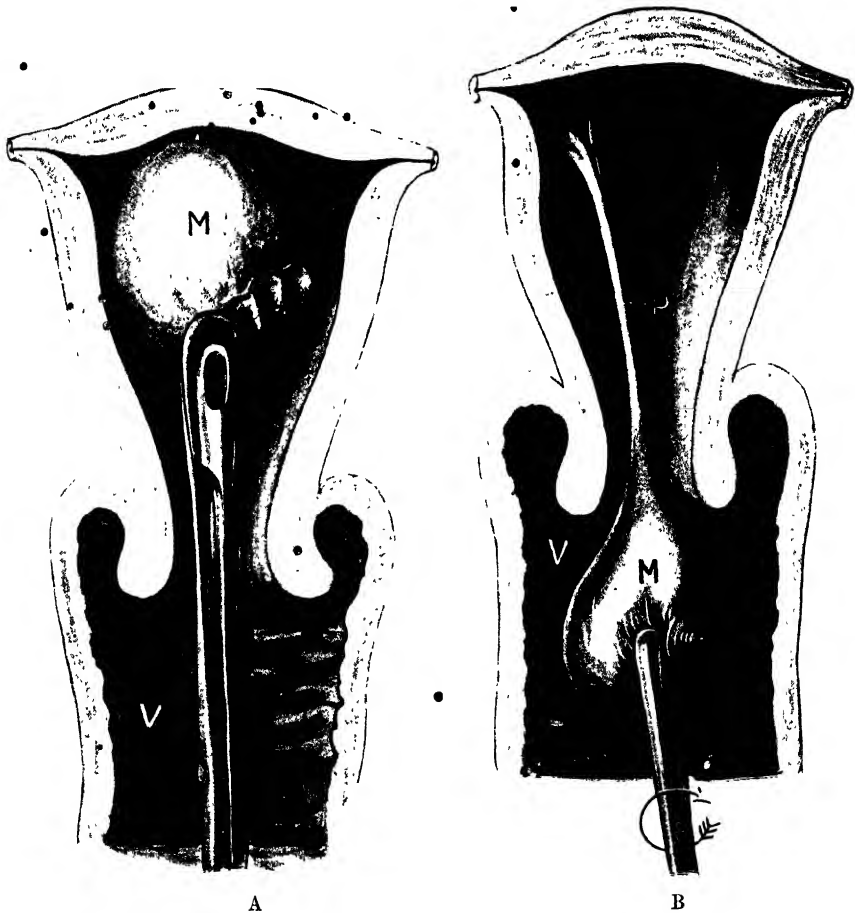


FIG. 279.—Removal of submucous myoma. A. Removal of sessile myoma with Schaltze's spoon forceps. B. Removal of pedunculated myoma by torsion. M. Myoma. V. Vagina. P. Pedicle. F. Large volsellum.

Another piece is then seized and similarly removed, and so on, keeping at first round the base of the tumour as much as possible. By this means a considerable portion is removed, and the capsule is gradually cut through sufficiently to permit of the remainder of the tumour being brought away in one piece. In the case of a large myoma, the process of removal is a very tedious one, and somewhat resembles.

vaginal hysterectomy by morcellation. The latter operation, however, is now, in our opinion, never indicated, whereas the morcellation of a large submucous myoma may be indicated when one wishes to save the uterus. Tumours reaching up to the umbilicus can be removed in this manner.



FIG. 280.—Ventral myomectomy. Incision of the pedicle of a pedunculated myoma.

When the whole of the tumour has been removed, the uterus is plugged tightly with iodoform gauze. A hypodermic injection of ergot may also be given to promote contraction of the uterus.

II. VENTRAL MYOMECTOMY.—There are two classes of myoma which can be satisfactorily dealt with in this manner. The first is the pedunculated subperitoneal myoma. In such a case, if the pedicle

is thin it can be directly tied and cut across; while if it is thick it can be cut out of the uterine wall by a wedge-shaped incision (*v.* Fig. 280), and bleeding is stopped by the mattress sutures which bring together the edges of the incision. This operation is extremely simple.

Where, however, the tumour is attached by a broad base, or where it is actually buried in the wall of the uterus, the operation is somewhat more troublesome, although it still is not a very difficult one. The first step consists in drawing the uterus to the utmost extent out of the pelvis. A long piece of gauze wrung out of warm saline solution is then passed round it, as low down as possible, the ends of the gauze being twisted together so as to make a temporary tourniquet. In this way, the blood supply of the uterus is cut off,

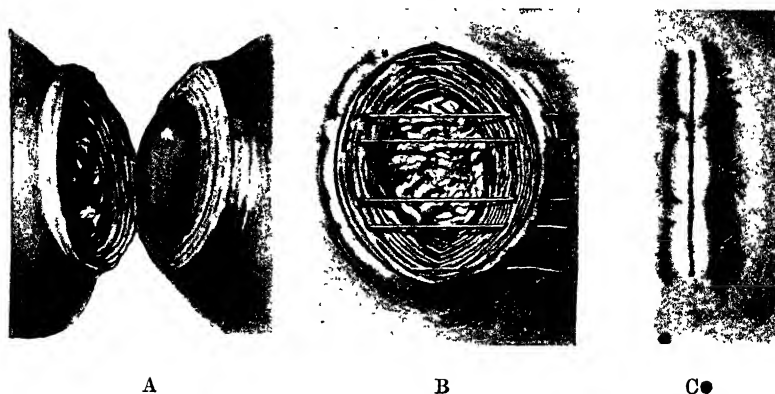


Fig. 281.—Ventral myomectomy. A. The pedicle of the tumour shown in Fig. 280, with division almost complete. B. Mattress sutures passed to close the gap left in the uterine wall. C. The mattress sutures tied.

and the removal of the tumour rendered bloodless. An incision is next made over the most prominent part of the tumour; its length depends upon the size of the latter, and it extends right through the capsule (*v.* Fig. 282). The tumour is then caught with a bullet forceps or a Muzeux forceps, and is drawn firmly outwards, its separation from the capsule being facilitated by blunt dissection, sometimes with the finger, sometimes with the handle of the scalpel, or the end of a blunt-pointed scissors. If firmer tissue is met with that will not separate in this manner, it is probable that the capsule has not been completely incised, and so this thicker piece is cut across with a scalpel, or with the scissors, in order to reach a fresh line of cleavage. In this manner, helped by firm traction on the forceps holding the myoma, the tumour is quickly enucleated, without, at the same time, removing any of the capsule (*v.* Fig. 283). As soon as this has been done, and the capsule has retracted, it can be trimmed to

whatever extent is considered wise, but, as a rule, it is better to leave too much than too little. The bed of the tumour is then obliterated by rows of continuous catgut sutures, the edges of the capsule are brought together by mattress sutures, and the peritoneal edges again



FIG. 282.—Abdominal myomectomy in the case of a large myoma. The capsule of the tumour has been incised, and the tumour itself caught and drawn outwards.

by a continuous suture (v. Fig. 284). In this way, tumours of all sizes and descriptions may be safely removed, irrespective of whether they project from the surface of the uterine wall or are completely incorporated in the uterus.

After-treatment.—After the removal of submucous myomata by the vaginal route, the plug which was inserted in the uterus may be removed

on the evening of the second, or the morning of the third day. If there is much discharge and the uterus is large, a hypodermic injection of ergot may be given daily for a week. After the uterus has returned to its normal size, it is frequently advisable to curette the cavity, in



FIG. 283.—Abdominal myomectomy. The bed of the myoma after enucleation of the latter.

order to cure the endometritis which is usually associated with a myoma. The after-treatment of other cases is similar to that of ventral or vaginal coeliotomy according to the route by which the operation was performed.

Complications.—Two serious complications may occur during the removal of a sessile submucous myoma;—an extensive opening may

be made into the peritoneal cavity through the base of the tumour; and, in the case of a myoma springing from the fundus of an inverted uterus, a portion of the uterus may be removed. In the former case, if the opening is not very large and there is no extreme hæmorrhage, it will probably be sufficient to plug the uterus with

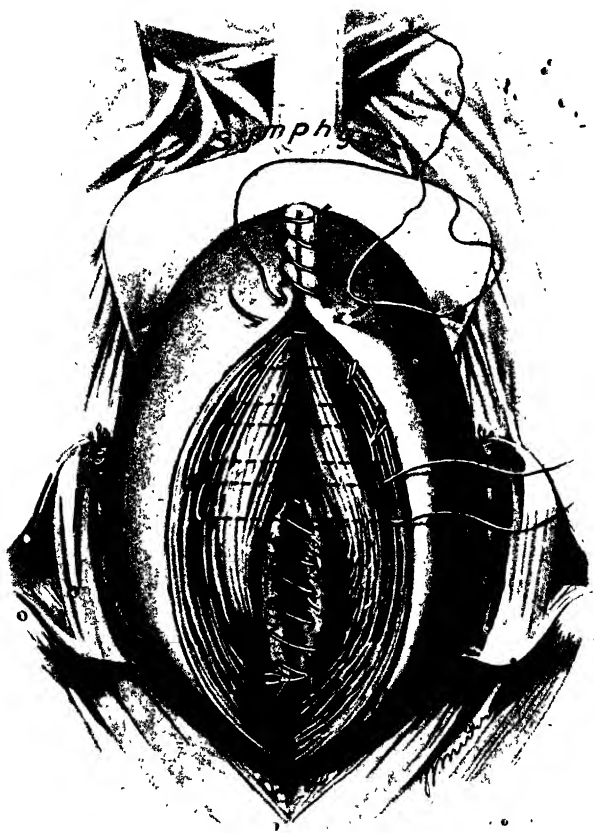


FIG. 284.—Abdominal myomectomy. Closure by three layers of sutures of the bed, the capsule, and the peritoneum respectively.

iodoform gauze in the ordinary manner. The patient must be carefully watched, because, if intra-peritoneal hæmorrhage occurs, it will be necessary to remove the uterus, or at any rate to perform a ventral cœliotomy, in order to suture the opening. In the case of the removal of part of an inverted uterus, vaginal hysterectomy is the proper treatment, unless the wound can be satisfactorily closed by suturing.

HYSTEROPEXY.

Hysteropexy (*ὑστέρα*, the womb; *πῆξις*, a fastening) is the term applied to the suture of the uterus to the abdominal or vaginal wall with the object of correcting a malposition.

Indications.—Hysteropexy is indicated under the following conditions :—



FIG. 283.—Abdominal myomectomy. Incision of the capsule of a small myoma to allow of enucleation.

- (1) In backward displacements of the uterus which give rise to symptoms, and which cannot be permanently cured by the wearing of a pessary, provided that the age or condition of the patient does not contra-indicate operation.
- (2) In prolapse of the uterus as an adjunct to other measures, in order to keep the uterus in a horizontal position in the pelvis, and so at right angles to the pelvic axis.

- (3) After operations on the appendages or the uterus, as a result of which it is probable that a displacement will occur if the uterus is left free.

Instruments.—Similar instruments are required as for ventral or vaginal celiotomy.

Operations.—The uterus may be sutured to the abdominal or vaginal walls, and accordingly there are two classes of operation:—

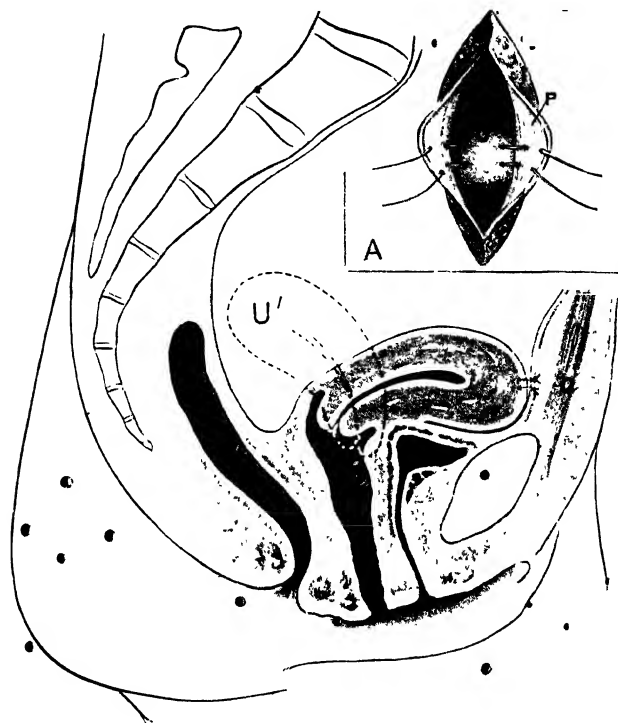


FIG. 286.—Kelly's ventral suspension. The position of the uterus after fixation has been performed. U'. The position prior to operation. A. The method of inserting the sutures. P. Peritoneum. U. Uterus.

(A) Ventral hysteropexy.

(B) Vaginal hysteropexy.

(A) **Ventral Hysteropexy.**—Ventral hysteropexy consists in suturing the fundus of the uterus to some portion of the abdominal wall in the median line. The term *ventral suspension* is applied to the operation when the fundus is fixed to the peritoneum of the abdominal wall in such a manner that it gradually draws out a band of peritoneum, which constitutes a new ligament, as it were, and which enables the uterus to preserve its normal mobility almost unimpaired. The term

ventral fixation is applied to the operation when the fundus is fixed to the rectus muscle, or to the fascia in such a manner that a permanent and inelastic bond of union results. Ventral fixation may give rise to trouble during pregnancy and labour as a result of this non yielding union, and therefore it is only permissible in women who are past the child-bearing period. In all other cases, ventral suspension is indicated. In both operations, the first step consists in

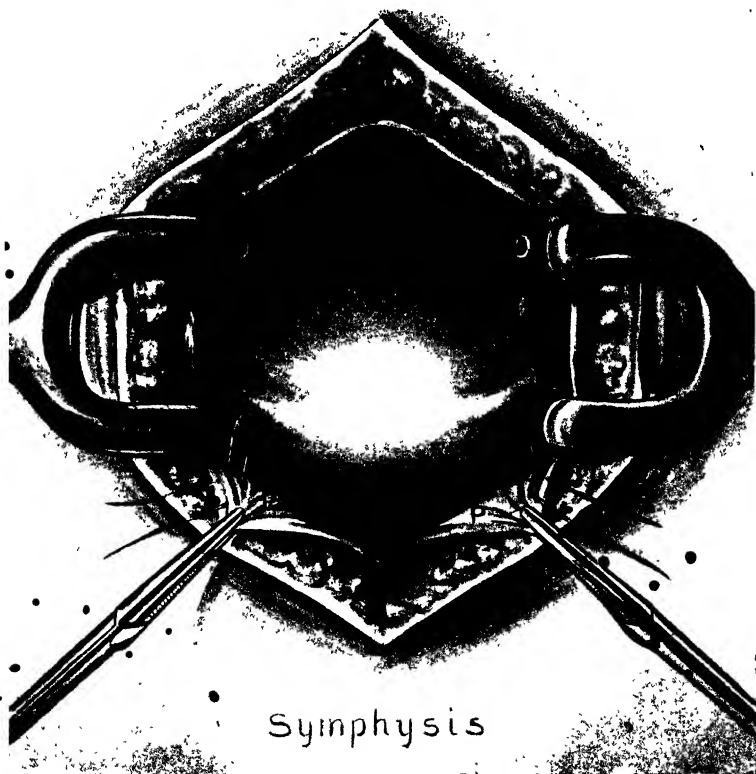


FIG. 287.—Olshausen's ventral suspension of the uterus. P. Peritoneum. R. Round ligaments. T. Tubes. O. Ovaries.

opening the abdomen in the middle line, immediately above the symphysis, and freeing the uterus, if it is held by adhesions. The remaining steps differ according to the particular form of operation adopted.

The method, which we usually adopt, of performing ventral suspension is that devised by Kelly. In this method, the sutures are so passed that the peritoneum alone of the abdominal wall is brought into contact with the posterior wall of the uterus just below the fundus. The steps of this operation are as follows:—

(1) The bladder is emptied with a catheter, and the abdomen is opened in the middle line by an incision of four or five inches in length, ending three-quarters of an inch above the symphysis.

(2) The patient is placed in the Trendelenburg position, and the uterus and the appendages are carefully examined. Any abnormal conditions such as new growths, salpingitis, oöphoritis, or pelvic adhesions, are treated as is considered best. The body of the uterus is then drawn up towards the abdominal incision by means of either an American forceps or a special ring forcèps made for the purpose (v. Fig. 210). If an American forceps is used, it should be applied

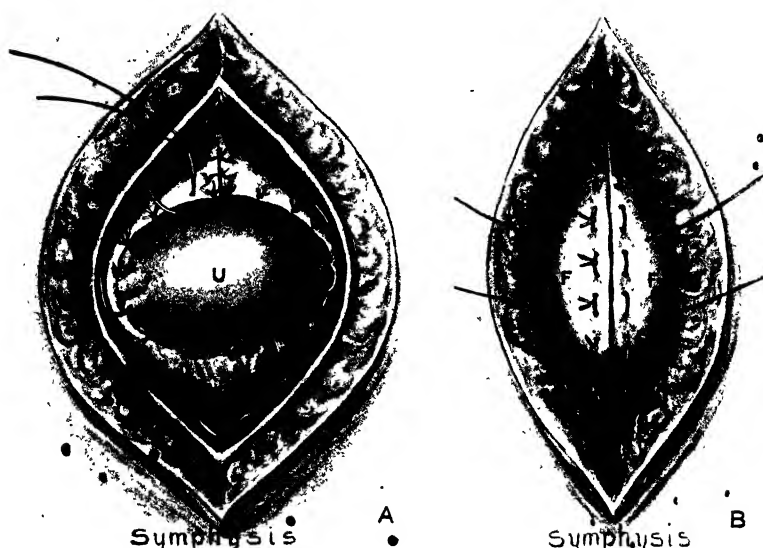


FIG. 288.—Ventral fixation of the uterus. A. Suture of the fundus of the uterus to the peritoneum. B. The fascia closed with mattress sutures, two fixation sutures (shown untied) in position. U. Uterus. P. Peritoneum. F. Fascia.

at the exact spot through which we intend to pass the sutures, as then the punctures made by the points are of no importance, since any tendency to bleed will be checked by the pressure of the sutures.

(3) The edges of peritoneum are caught in a clip forceps at both sides of the wound, and are drawn outwards. A small curved needle, threaded with a silk suture, is entered on the inner surface of the peritoneum about a centimetre from the edge, and as near as possible to the lower end of the incision. It traverses the peritoneum and the extra-peritoneal fatty tissue, and again emerges on the inner surface, including about a centimetre of peritoneum. It is then passed through the posterior surface of the uterus in the middle line, one or two

centimetres below an imaginary line drawn between the uterine insertion of the tubes. It includes a piece of uterine tissue about a centimetre in width and a quarter to half a centimetre in depth. On emerging from the uterus, it finally traverses the peritoneum at the opposite side of the incision, at a corresponding point to, but in the reverse manner to, that in which it was entered (*v. Fig. 286, A*). This suture is drawn tight, taking care that a piece of intestine is not included between it and the uterus, and is tied. A second suture is then introduced. It passes through the peritoneum in a similar manner to, and about a centimetre above, the first suture, and through the posterior uterine wall a centimetre below it (*v. Fig. 286*). We are in the habit of including in the suture a little of each rectus muscle in addition to the peritoneum, as by so doing the peritoneum is kept in place and does not tend to fall away from the back of the muscle under the influence of the pull of the uterus. Care must, however, be taken that the muscle does not come into contact with the uterine wall.

(4) The omentum is drawn down, a careful examination is made to see that a loop of intestine has not been caught in the loop of a suture or below the uterus, and the abdominal wound is closed in the usual manner.

Ventral fixation can be carried out as follows:—

The uterus is drawn partially out through the abdominal incision, and the edges of the peritoneum are sutured to the fundus in such a manner as to leave uncovered the entire top of the uterus (*v. Fig. 288, A*). Two fixation sutures are then passed, which traverse the rectus fascia at each side and pass deeply into the muscle of the fundus. The fascia is then brought together in the usual manner (*v. Fig. 288, B*), the fixation sutures are tied, and the remainder of the incision closed. By this means a large area of the uterus is brought into close contact with the recti muscles and the fascia.

(B) **Vaginal Hysteropexy.**—Vaginal hysteropexy consists in suturing the uterus to the anterior vaginal wall, or in some cases to the bladder. Anterior colpotomy is first performed as has been already described, and then the uterus is freed from adhesions, and brought forward into the opening in the anterior vaginal vault. Three silkworm-gut sutures are used to fasten it in this position. They are entered through the vaginal flap at one side, then passed through the peritoneum at the same side, then through the middle of the anterior surface of the uterus, and then through the peritoneum and vaginal flap of the opposite side. The sutures should traverse the uterus just sufficiently above the level of the uterine isthmus to keep the fundus forwards (*v. Fig. 289*), and their exact position depends upon the size and length of the uterus. The heavier and the longer the uterus, the higher the sutures must be passed through the

anterior uterine wall. It is a mistake to pass them higher in the body than is necessary, as, the higher they are situated, the more the normal degree of mobility of the uterus is interfered with. The sutures are passed about a centimetre apart, and should not be tied until the vaginal wound has been united by a continuous catgut suture.

After-treatment.—The after-treatment of these cases is similar

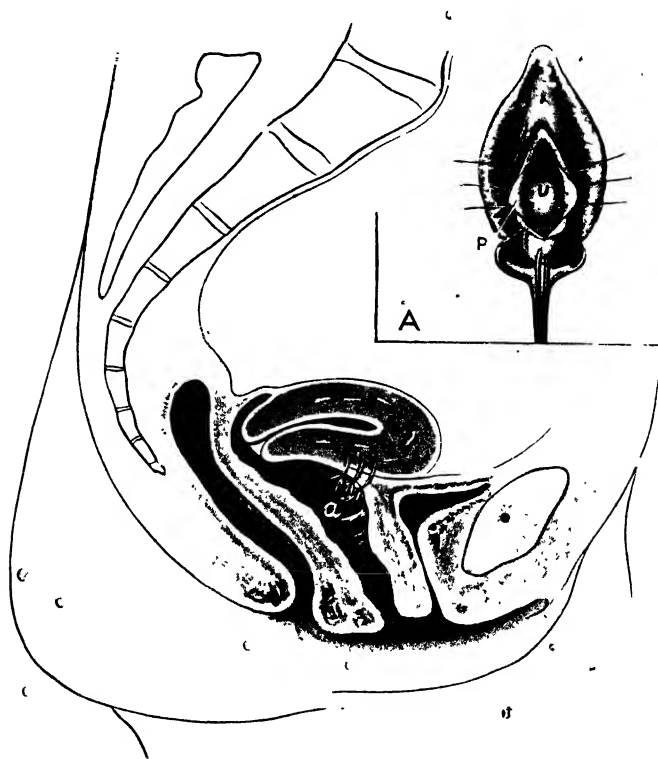


FIG. 289.—Vaginal hysteropexy. The fixation sutures in position.
U. Uterus. a. Sutures. A. The method of inserting the sutures.
P. Peritoneum.

to that of ventral or vaginal coeliotomy as the case may be. During the first four or five days, the catheter should be passed every four hours, if the patient cannot empty the bladder of her own accord, to prevent any undue pressure on the uterus by a distended bladder. In the abdominal operation, the sutures are buried, and are not removed, while in the vaginal operation the fixation sutures are taken out, as a rule, in three weeks. The patient should not be allowed out of bed for at least fourteen days, and a longer time is advisable if the uterus is of large size.

THE INTERPOSITION OF THE UTERUS.

The term interposition of the uterus is applied to the operation in which the body of the uterus is brought down between the anterior vaginal wall and the bladder, in such a manner as to lie below the bladder (*v.* Fig. 291). In this position, it supports



FIG. 290.—The interposition of the uterus. Suture of the vesical peritoneum to the posterior uterine wall in the region of the internal os. B. Bladder. P. Peritoneum. O. Ovary.

the anterior vaginal wall just as if it was a ball pessary in the vagina, and so tends both to offer the maximum resistance to its own descent, and also to support the vaginal walls. Interposition in the case of an uterus of sufficient size, and associated with shortening of elongated utero-sacral ligaments, is one of the best methods of keeping a prolapsed uterus at a proper level in the pelvis. There

is one serious objection to the operation, namely, that it cannot be safely performed during the child-bearing period, unless, at the same time, measures, such as the division of the tubes, are taken to prevent the occurrence of pregnancy.

Indications.—Interposition is indicated in complete prolapse of the uterus, especially when associated with cystocele, and also in marked cystocele occurring apart from prolapse of the uterus.

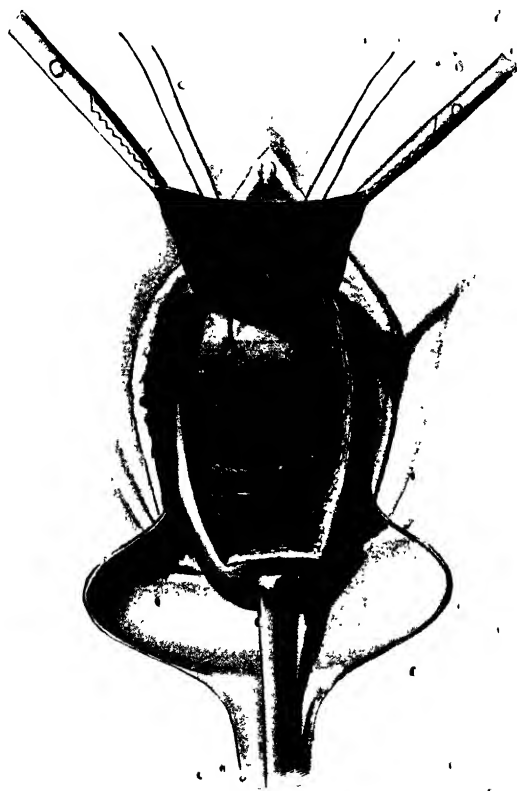


FIG. 291.—The inversion of the uterus. Sutures of the fundus of the uterus to the vaginal flap.

Instruments.—The instruments required are similar to those used for vaginal coeliotomy.

Operation.—The cervix is caught with a strong forceps, and is drawn down as far as possible, in order to put the anterior vaginal wall on the stretch. The bladder is then exposed, either by dissecting up a flap, as shown in the illustrations (v. Figs. 236—239), or by means of a single median incision, running from just above the urethra down to the vaginal portion of the cervix. The position of the bladder is

then outlined, and it is gently pushed upwards off the uterus, where necessary dividing any dense attachments with the scissors. This upward detachment must be as complete as possible, not only in the middle line, but also laterally. The utero-vesical pouch is then opened by incising the peritoneum, and the body of the uterus is brought down through the opening, bringing it out as far as possible so as to expose the entire posterior uterine wall (v. Fig. 290). The edge of the vesical peritoneum, forming the anterior margin of the opening in the utero-vesical pouch, is sutured to the posterior uterine wall in the region of the internal os, thus mooring the bladder above the uterus. Two sutures are usually required to fix the peritoneum into position, and they should be passed with a fine needle, taking particular care to penetrate only the uterine muscle, and not to deviate too far laterally for fear of injuring the-uterine vessels. The fundus of the uterus is then moored by sutures to the vaginal mucous membrane as near the urethral orifice as possible (v. Fig. 291). Lastly, the flap of vaginal mucous membrane is brought back again into position over the body of the uterus, in such a manner as to cover the latter completely (v. Fig. 241), or, if a single median incision was made in the first instance, it is closed in the ordinary way.

After-treatment.—The after-treatment of the case is that of vaginal cœliotomy. The sutures may be removed about the tenth day.

CHAPTER IV.

OPERATIONS ON THE TUBES AND OVARIES AND UTERINE LIGAMENTS.

Salpingectomy—Oöphorectomy—Salpingo-oöphorectomy. Salpingostomy. Ovariectomy. Resection of the Ovary and Ignipuncture. Shortening of Utero-sacral Ligaments—Shortening of Round Ligaments—Suspension by Round Ligaments.

SALPINGECTOMY; OÖPHORECTOMY, SALPINGO-OÖPHORECTOMY.

SALPINGECTOMY (σάλπιγξ, a trumpet; ἐκτομή, a cutting out) is the term applied to the removal of the tubes. **Oöphorectomy** (ὄον, an egg; φέρω, I bear; ἐκτομή, a cutting out) is the term applied

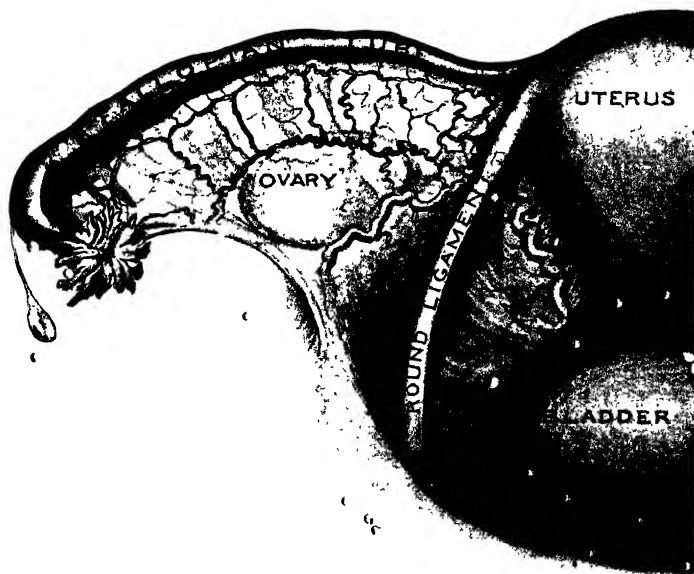


FIG. 292.—The broad and round ligament on the right side.

to the removal of the ovary for any condition other than a new growth. Salpingo-oöphorectomy includes the removal of both ovary and tube.

Indications.—The following conditions of the Fallopian tubes are indications for salpingectomy alone, if the ovary is sufficiently healthy to be left:—

- (1) Cystic conditions, pyo-, and hæmato-salpinx.
- (2) Inflammatory changes, which are too extensive to be cured by palliative treatment or plastic operations.
- (3) New growths, which are non-malignant.
- (4) Tubal pregnancy.

Oöphorectomy is indicated in the following conditions, when they cannot be relieved by non-operative measures or permanently cured by puncture or resection of the ovary:—



FIG. 293.—The uterus and broad ligaments as seen from behind. The uterine arteries are exaggerated in order to show their position.

- (1) Ovarian infection, either with or without abscess formation.
- (2) Cirrhosis of the ovary, associated with severe pain. This is an exceptionally rare indication.

Salpingo-oöphorectomy is indicated when both the tube and the ovary also is diseased.

Instruments.—The instruments required are the same as those mentioned under the head of ventral or vaginal celiotomy, according to the route followed.

Operation.—The first point to determine is the route by which the diseased tube is to be removed. The technique of ventral celiotomy has been so greatly improved, and in consequence the risks so considerably diminished, that we prefer the abdominal route in all

cases of operations on the adnexa, except in the occasional cases in which it is necessary to operate in the presence of an acute infection. In such cases, we should always operate by the vaginal route.

As soon as the abdomen has been opened, the patient is placed in the Trendelenburg position, and the pelvic organs are carefully examined, in order to ascertain the condition of the appendages and of the uterus, and the extent of the adhesions which are usually present. The nature of the adhesions in tubo-ovarian infection varies greatly

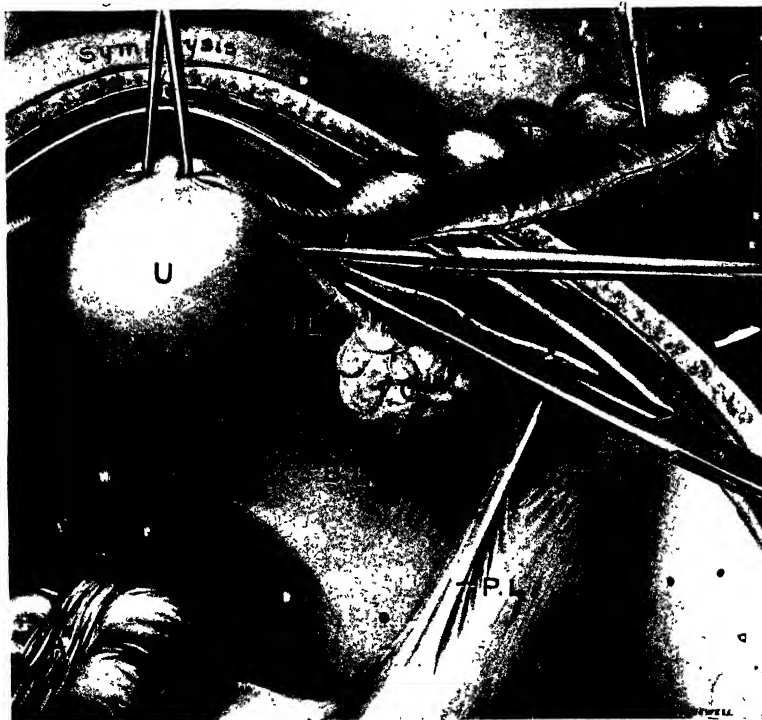


FIG. 294.—Salpingectomy. Clamping and division of the broad ligament. U. Uterus. O.L. Ovarian ligament. O. Ovary. B.L. Broad ligament. P.L. Infundibulopelvic ligament. T. Tube.

according to the extent of the infection, and its age. In some cases they are friable, and are readily broken down with the finger. In other cases they are so dense as to require division with the scissors or the scalpel. They have usually formed between the tube and the intestines, and between the tube and the peritoneum of the pouch of Douglas, of the rectum, and of the back of the uterus. Intestinal adhesions must be separated before trying to free the tubes in order that the intestines may be pushed completely out of the field of operation. If the intestinal wall is injured it must be carefully

repaired. After this step, the nature of the adhesions between the appendages and the pelvic peritoneum is ascertained. If they are slight or absent, the remaining steps of the operation are as follows:—The uterus is first caught with a bullet forceps or the special ring forceps, and drawn out into the wound, so bringing the appendages nearer to one. This is easily performed if there are no adhesions, but if there are adhesions, these must be first separated. This can be accomplished by wiping them off by means of a gauze sponge, by breaking them down with the fingers, or, if they are very firm, by dividing them with a scalpel or scissors. Any vessels in the adhesions that bleed must be tied.

The tube being now free, the next step consists in clamping the

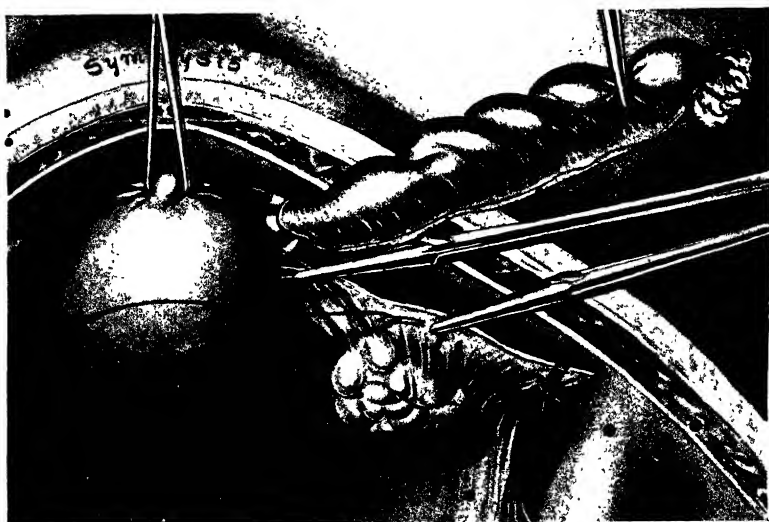


FIG. 295.—Salpingectomy. The interstitial portion of the tube is in process of excision, and the clamps on the broad ligament are being replaced by sutures.

broad ligament with a long and slender clamp, applied as shown in Fig. 294, and dividing it above the clamp. This leaves the tube attached by its uterine insertion alone. The next step consists in cutting across the tube about half an inch from the uterus, and as in doing this septic matter, if present, will escape, great care must be taken to avoid the dissemination of infection. With this object the tube and uterus are carefully isolated from the abdominal cavity by packing round them with sponges, and the tube is grasped with a clamp forceps just outside the spot at which it is proposed to divide it. It is then quickly cut across and removed. The uterine end is next disinfected either by wiping its lumen out with a probe carrying a little pure carbolic acid, or with the fine point of a Paquelin's cautery.

If there is any bleeding from the cut end, it can usually be checked by applying a clip forceps to the side of the uterus just below the stump of the tube.

If the uterine end of the tube is thickened or contains pus, its interstitial portion also should be extirpated. This is easily done by cutting it out of the uterine wall with a sharp-pointed knife (*v.* Fig. 295). The edges of the cavity left are then brought together with catgut sutures (*v.* Fig. 296, A).

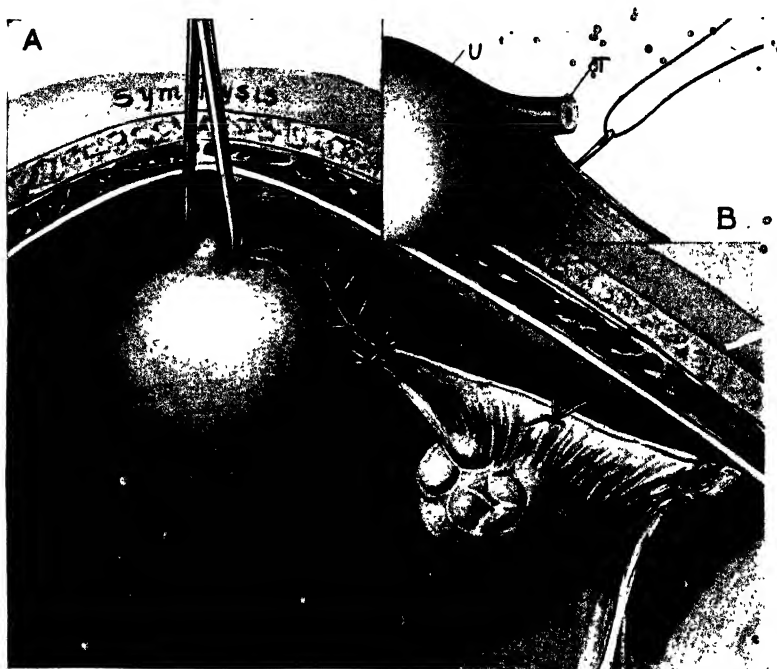


FIG. 296.—Salpingectomy. A. The operation finished, after complete excision of the tube. B. The method of tying the vessels when the stump is left. U. Uterus, T. Tube.

The next step consists in tying any bleeding vessels, and, as a preliminary to this, the long clamp is removed, and the vessels which bleed are caught separately with smaller forceps. These vessels are then tied with catgut sutures, so passed as to include the vessel and a small portion of the broad ligament (*v.* Fig. 296). As soon as all the vessels have been tied, the top of the ligament is stitched over with fine catgut to bring the edges of the peritoneum together.

Oöphorectomy is performed as follows:—The ovary to be removed is caught with the ovary forceps, while light clamps are applied to the ovarian and the infundibulo-pelvic ligaments (*v.* Fig. 297), so

as to control the blood supply. The ovarian ligament is next divided outside the clamp, and the ovary is removed from the back of the broad ligament. The ovarian ligament and any bleeding vessels in the broad ligament are tied separately, and, if a gap has been left in the broad ligament, the divided edges of peritoneum are sutured together by means of continuous catgut suture.

Salpingo-oöphorectomy is performed in a very similar manner to salpingectomy, except that when the adhesions are not too dense, instead of applying a single clamp between the tube and the ovary, a clamp is applied to the infundibulo-pelvic ligament outside the ovary, and a second and smaller clamp to the ovarian ligament

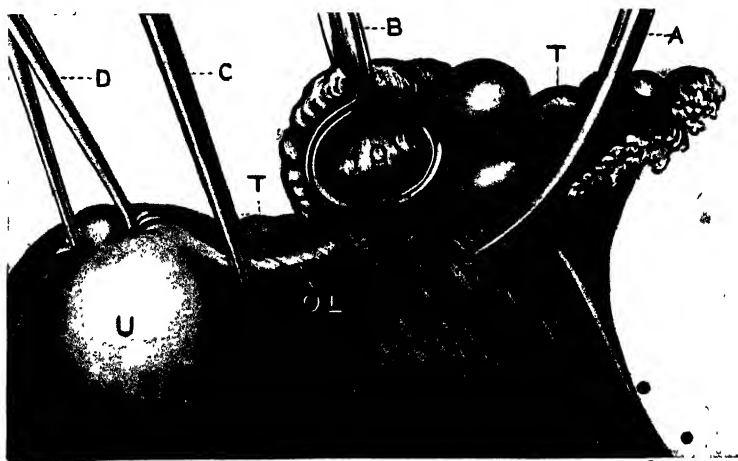


FIG. 297.—Oöphorectomy. The ovarian ligament and infundibulo-pelvic ligament have been clamped, and the ovary drawn upwards to facilitate its removal. U. Uterus. D. Forceps on uterus. C. Clamp on O.L., ovarian ligament. T. Tube. O. Ovary. B. Ovarian forceps. A. Clamp on infundibulo-pelvic ligament.

(v. Fig. 297). The broad ligament is then divided, beginning at the outer end, and working up to the uterine insertion of the tube, which is in turn clamped and divided as has been described. The clamps are then replaced by ligatures. Lastly, the peritoneum is, if possible, brought together over the cut edges of the ligament.

When the vaginal route is adopted, the foregoing operations may be performed through either the anterior or the posterior fornix. The former is the more suitable in most cases, as if the infundibulo-pelvic ligament is short, it is difficult to reach it through the posterior fornix. Oöphorectomy and salpingo-oöphorectomy are comparatively easy in the absence of adhesions, but, if the latter are dense, the operation will be most difficult, and, if there are intestinal adhesions, it may be impossible on account of the difficulty of reaching the

intestine. Moreover, violent manipulations with the object of separating adhesions may lead to rupture of the intestinal wall.

After-treatment.—The after-treatment is in the main similar to that of ventral or vaginal cœliotomy, as the case may be. It is very important to place the patient in Fowler's position at the earliest possible moment after the operation, in order that all fluid



* FIG. 298.—Salpingo-oophorectomy. Separation from without inwards. The method to adopt when possible.

in the peritoneal cavity may drain into the pelvis, and also, that drainage through the gauze into the vagina, when such drainage is adopted, may be facilitated. The removal of the gauze is begun on the morning of the second day, and may be completed within the next twenty-four to forty-eight hours. If, however, the patient's temperature or pulse rises, it may be advisable to remove the gauze sooner. We have already noticed the necessity for bacteriologically examining the fluid in the peritoneal cavity or in the

tubes in these cases of pelvic infection. The necessary material is obtained at the beginning of the operation, when first the pouch of Douglas is opened up. Subsequently, if the examination shows the presence of organisms, and if a culture can be grown, vaccine treatment should be adopted if the symptoms of the patient show that infection has occurred.

SALPINGOSTOMY.

Salpingostomy (σάλπιγξ, a trumpet; στόμα, a mouth) is the term applied to the operation for making a new abdominal ostium to the tube, or to the dilatation of the natural opening which has become contracted or obliterated. Pozzi applies the term to the former operation alone, that is, to those cases in which an entirely new opening is



FIG. 299.—Salpingostomy. The distal end of the tube has been split, and its mucous and peritoneal coats are being brought together by suture. U. Uterus. T. Tube. O. Ovary.

made; while to the latter and more common operation he applies the term salpingotomy (σάλπιγξ; τομή, a cutting). The value of salpingostomy, if it is successful, lies in the fact that it may enable an ovum to reach the uterus, and pregnancy to occur. Some successful cases have been recorded, but it is probable that frequently the edges of the new ostium adhere to one another, and again obliterate the opening.

OVARIOTOMY.

Ovariectomy (ovarium, an egg-holder; τομή, a cutting) is the term applied to the removal of the ovary for a new growth as distinguished from oophorectomy, by which is meant the removal of the ovary for any condition other than a new growth. The term ovariectomy is also loosely applied to the removal of cystic tumours of the broad ligament.

Indications.—Ovariectomy is indicated in the case of all malignant and papillary tumours of the ovary or broad ligament, which are not

too far advanced to prevent their entire removal, and in the case of benign tumours which cannot be removed by resection.

Instruments.—The instruments are the same as those required for ventral or vaginal coeliotomy, as the case may be, with the addition of a cyst forceps (v. Fig. 300).

Operation.—Small solid tumours and small or medium-sized cystic tumours of the ovary may be removed by the vaginal route, but we do not recommend it. Medium-sized or large solid tumours and large cystic tumours must be removed by the abdominal route.

Abdominal ovariectomy is performed as follows:—

A median incision is made of sufficient length to allow the tumour to be removed entire (v. Fig. 301). The hand is passed into the abdomen, and the surface of the tumour is carefully examined all over to see if it is free from adhesions. If adhesions are felt,

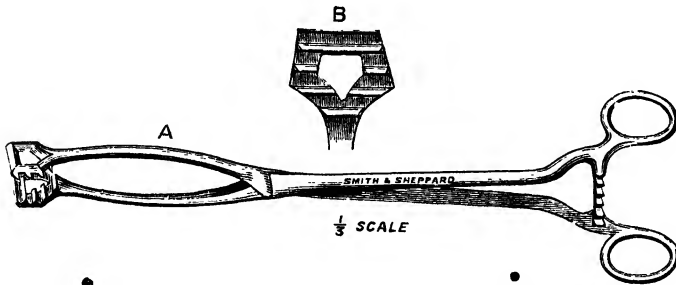


FIG. 300.—Péan's cyst forceps. B. View of blade.

they must be separated. If they are recent, they can usually easily be broken down, but if they are of long standing, they may convert what would otherwise have been an easy operation into one of extreme difficulty. Recent adhesions can be separated with the fingers, or can be wiped off with a sponge. Long string-like adhesions may be torn across or divided with the scissors, and, if vessels run in them, they must be tied on the peritoneal side of the division. Firm fibrous adhesions between the intestines or uterus and the tumour must be divided with the knife, the divisions being always made in the case of intestino-ovarian adhesions, at the expense of the tumour, unless the latter is malignant, when it will be necessary to resect a part of the intestine. If such adhesions contain vessels, the bleeding may be checked by sewing over the cut surface with catgut, and the same must be done if their separation involves the stripping of the peritoneal coat of the intestines. Adhesions behind the tumour will come into view as the tumour is drawn out.

If it is obvious at the beginning that the tumour is too large to be brought out through an incision, no matter how long, then it is useless to

- make the incision longer than is sufficient to allow free access to the
- tumour, that is to say, it will probably extend up to or a little above
- the umbilicus. • In such cases the cyst must be tapped in the following
- manner as soon as the adhesions have been separated as far as possible :
- —An assistant presses gently upon the tumour with his hands laid
- flat on the abdominal wall at each side of the incision. By this means



FIG. 301.—Ovariectomy. A long incision has been made, and the cyst brought out through it without evacuation of its contents. *a.* Ovarian ligament. *b.* Infundibulo-pelvic ligament.

the tumour is made to bulge outward through the incision, and the abdominal wall is kept in close contact with it, so preventing the escape of fluid into the peritoneal cavity. A small incision is then made with a scalpel in the centre of that part of the cyst wall which bulges through the wound. The pressure exerted by the assistant drives the contents of the cyst through this opening in a steady stream, which can be directed into a basin (*v.* Fig. 302). As the cyst collapses, the operator passes one blade of a clamp forceps or of a Péan's cyst forceps into the cyst, and, the other blade being outside, takes a firm hold on the wall.

By means of this forceps, supplemented if necessary by others, the collapsing cyst is drawn gradually out of the abdomen (*v.* Fig. 303). If the puncture of one of the cystic cavities does not afford sufficient reduction in its size, then the finger is passed through the opening in the cyst wall so as to examine for other cavities as yet unpunctured, and these in turn may be opened into the original cavity by pushing the end of a slender clamp through their wall.

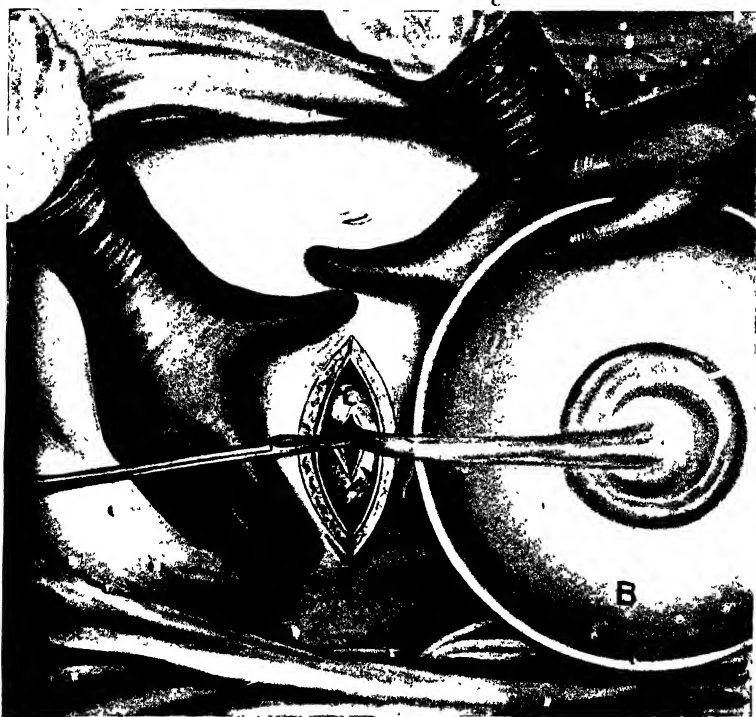


FIG. 302.—Ovariotomy. The cyst is punctured, and the fluid expressed by the pressure of the hands on the abdominal walls. C. Ovarian cyst. B. Basin for receiving fluid. (The usual sterilised coverings on the abdomen are omitted in order to make the position of the hands and of the incision more obvious. The incision also is shorter than is wise.)

The cyst has now been withdrawn from the abdomen, and if it is pedunculated, its pedicle is caught in one or two clamp forceps, and is cut across above the forceps, and the tumour removed (*v.* Fig. 304). In applying the forceps care must be taken to avoid including the round ligament, as it is usually quite unnecessary to remove or injure the latter. The vessels in the pedicle are then caught separately in smaller forceps, and tied (Fig. 305). Lastly, the peritoneum is brought together with a continuous suture of catgut over the cut edge of the broad ligament (*v.* Fig. 305, A).

If the cyst is intra-ligamentous and consequently has no pedicle, it must be enucleated, and any bleeding vessels tied. With this object, an incision is made carefully through the investing peritoneum at a point free from blood-vessels, and, with the finger passed between the peritoneum and the cyst wall, the latter is gradually enucleated. This procedure is very easy in the case of small cysts lying fairly high in the broad ligament, but in the case of cysts that have

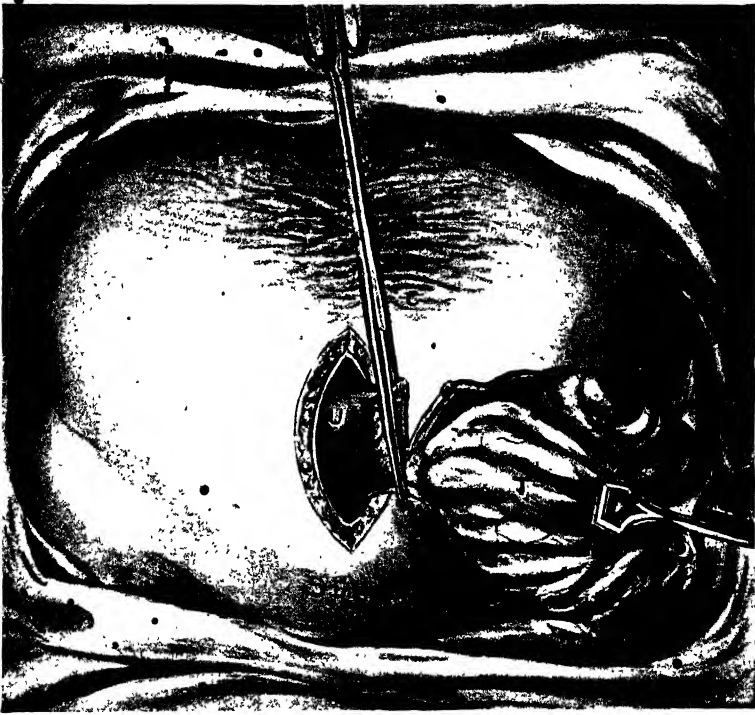


FIG. 303.—Ovariotomy. The collapsed cyst has been drawn out of the peritoneal cavity. Its pedicle is clamped, and is in process of division. U. Uterus. T. Cyst. T¹. Accessory cyst. C. Clamp on pedicle.

burrowed deeply towards the floor of the pelvis, the operation may be most difficult. In such cases it is necessary to take particular care to free the ureter from the cyst wall, and to locate the large pelvic blood-vessels. Also to avoid injuring the mesentery of the rectum or of any part of the intestines, as the cyst may have come into intimate relation with it. Large bleeding vessels must be tied or clamped as they appear, while smaller vessels may be left untied until the cyst is removed. As soon as this is done, any further vessels that bleed are tied, and the peritoneum is brought back into place, and its edges sutured together so as to cover over any exposed area. If there is

much space behind the peritoneal flap, it is usually well to place a firm tampon of gauze in the pouch of Douglas, so as to keep the peritoneum pressed into place, and to prevent the collection of blood behind it. The end of the gauze is brought into the vagina. When the tumour is malignant or papillary both ovaries should



FIG. 304.—Ovariectomy. The tumour has been removed, and the blood vessels in the pedicle are controlled by two clamp forceps.

be removed, accompanied by a very free extirpation of the broad ligaments, of the aortic glands, and of the glands of the promontory, and, as a rule, of the uterus also. When the uterus is left, a ventral suspensior should always be performed, as otherwise there will almost certainly be a backward displacement subsequently.

Ovariectomy performed by the vaginal route is a very simple operation in the case of quite small tumours, and can be performed

through either the anterior or the posterior fornix. The ovary is exposed and caught in a forceps and drawn down. Its pedicle is then tied, the tube being removed at the same time, if it cannot be separated from the ovary.

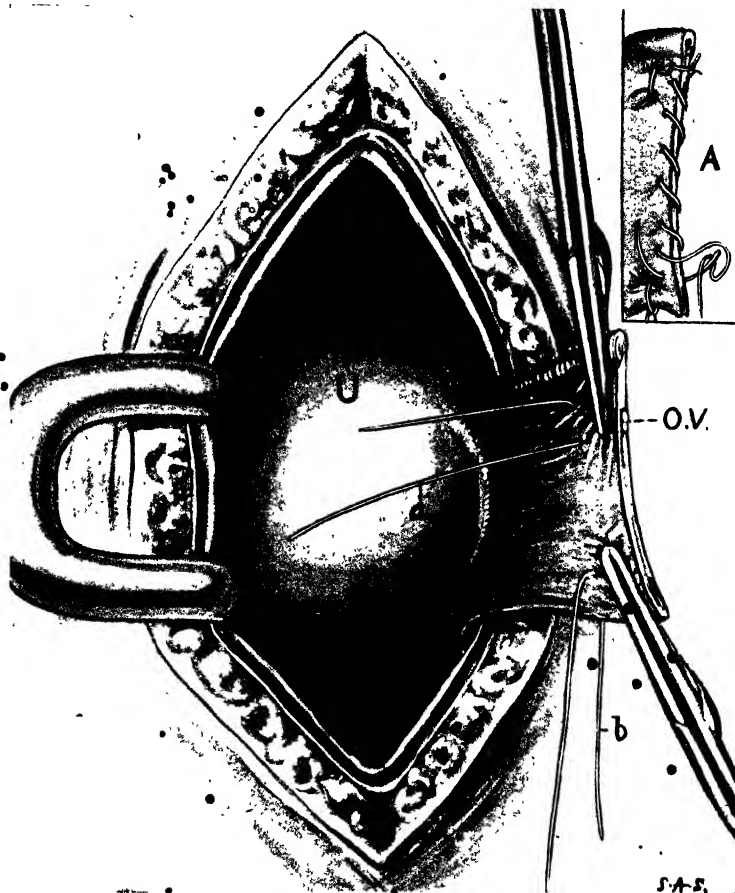


FIG. 305.—Ovariectomy. The long clamp has been replaced by two shorter clamps on the ovarian and uterine vessels, and these vessels are in process of being tied. U. Uterus. O.V. Ovarian ligament. B.L. Broad ligament. a. Ligature on ovarian artery. b. Ligature on infundibulo-pelvic ligament. A. Stump of pedicle, showing arteries tied, and continuous catgut suture applied to peritoneal edges.

• **Complications.**—The most important complications, which may be met with in the course of an ovariectomy, are:—

(1) **Adhesions.**—These are met with of all degrees of strength. Usually they can be easily broken down or divided, but, on the other hand, they may be so dense and numerous as to prevent the removal of the cyst wall.

(2) Fistulous openings between the cyst and any of the abdominal viscera.—If such openings are found, they must be carefully closed as soon as the cyst is separated, in order to prevent fouling of the peritoneal cavity.

(3) Twisted pedicle.—The chief danger of this condition is in cases in which tapping of the cyst is performed, as, during this procedure, the cyst tends to untwist itself, and, as this untwisting occurs, the opening in its wall may be carried away from the opening in the abdominal wall, so permitting an escape of the contents into the peritoneal cavity. It is essentially wise to remove intact cysts whose pedicle is twisted, as in such cases changes of a septic nature may have started in the cyst contents.

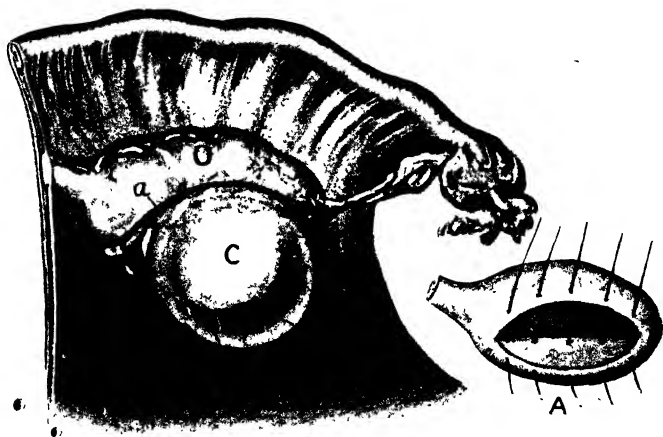


FIG. 306.—Resection of ovary. O. Ovary. C. Cyst. a. Line of incision. A Suture of resultant gap in ovary.

(4) Suppuration of the contents.—There is nothing to be said about this condition except to call attention to the extreme importance of preventing any of the contents finding their way into the peritoneal cavity. Here again it is essential that the cyst should be removed intact.

After-treatment.—The after-treatment of ovariectomy is similar to that of ventral or vaginal celiotomy.

RESECTION OF THE OVARY.

By the term resection of the ovary is meant the excision of the diseased portion of the ovary, with the object of leaving the healthy portion. Ignipuncture is the term applied to the cauterisation of small cysts of the ovary with the object of destroying the cyst wall and leaving the healthy portions of the ovary behind.

Resection is indicated when the pathological condition is limited to a portion of the ovary, and ignipuncture may be indicated when the ovary is invaded more or less uniformly with small cysts.

SHORTENING OF THE UTERO-SACRAL LIGAMENTS.

Shortening of the utero-sacral ligaments, with the object of drawing the cervix upwards and maintaining it in that position, is usually carried out by the vaginal route.

Indications.—The operation is indicated when there is marked lengthening of these ligaments, as in cases of prolapse.

Instruments.—The instruments required for the intra-peritoneal operation are similar to those required for ventral cœliotomy; the



FIG. 307.—Ignipuncture of microcystic ovary. The ovary has been split, and the cysts punctured and their lining destroyed. (The ovary is shown enlarged for purpose of clearness.)

instruments required for the extra-peritoneal operation are similar to those required for vaginal cœliotomy.

Operation.—This operation is carried out by the vaginal route. The first step consists in drawing the cervix down with an American forceps, and then making a short transverse incision at the posterior cervico-vaginal junction. Each ligament is then caught with a clip forceps just above its attachment to the cervix (v. Fig. 308), and is cut away from its uterine insertion between the forceps and the uterus.

The next step consists in drawing the cervix backwards, and in

making a transverse incision at the anterior cervico-vaginal junction, just through the mucous membrane. The point of a clip forceps can now be pushed from before backwards along the side of the uterus,



FIG. 308.—Extra-peritoneal shortening of the utero-sacral ligaments. The ligaments have been exposed, and are being caught in clip forceps. L. Ligaments. P.V. Posterior vaginal wall.

entering it through the end of the anterior incision, and bringing it out through the posterior incision. The end of the corresponding utero-sacral ligament is caught in this forceps and drawn forward. A similar course is then adopted at the opposite side. The opening in

- the posterior vaginal fornix and in the peritoneum of Douglas' pouch may now be closed, taking care to tie any bleeding vessels. The
- cervix is next pushed back into the vagina as high as it will go, and

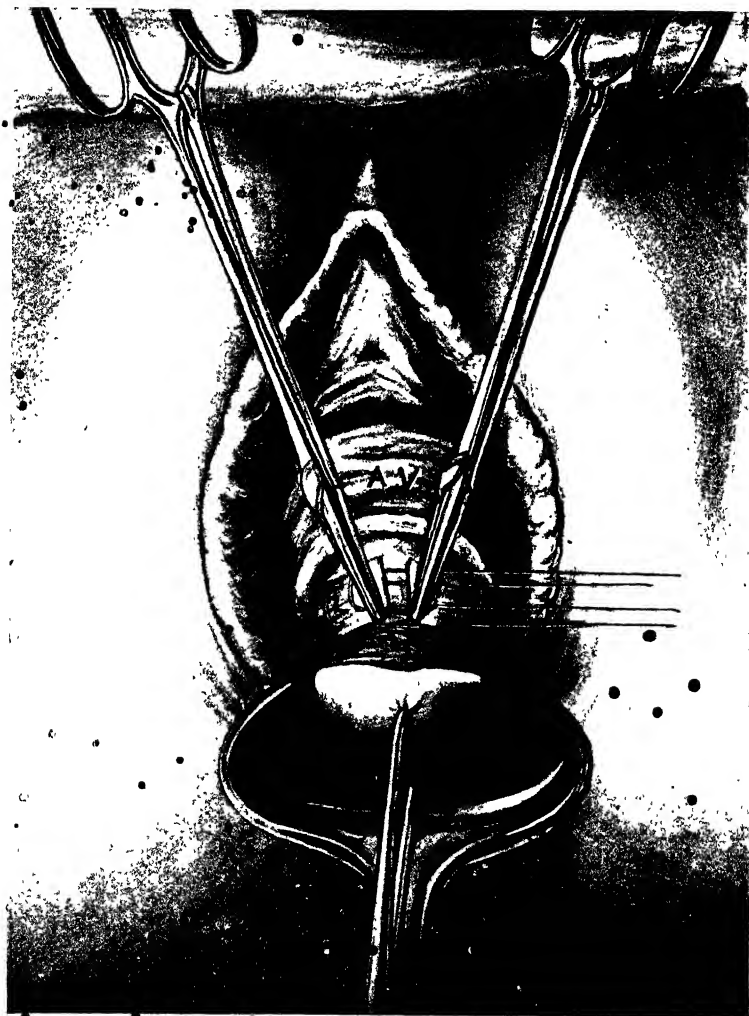


FIG. 309.—Extra-peritoneal shortening of the utero-sacral ligaments. The ligaments have been detached posteriorly and brought round in front of the cervix. A.V. Anterior vaginal wall. L. Ligament.

the utero-sacral ligaments drawn out at the anterior opening as far as they will come. They are then sutured to one another in the middle line immediately below the cervix (*v.* Figs. 309, 310). The last step consists in closing the incision in the anterior vaginal fornix with a few interrupted sutures.

After-treatment.—The after-treatment is similar to that of ventral or vaginal coeliotomy, as the case may be.

OPERATIONS ON THE ROUND LIGAMENTS.

SHORTENING OF THE ROUND LIGAMENTS.—Shortening of the round ligaments at the external inguinal ring is indicated in cases of retro-deviation of the uterus in which it is desired to effect a radical cure, and in which the appendages and the pelvic peritoneum are healthy, also certain cases of prolapse of the uterus.



FIG. 310.—Extra-peritoneal shortening of the utero-sacral ligaments. The ligaments sutured together in front of the cervix. L. Ligament.

Instruments.—The instruments required are :—A scalpel, a needle-holder, medium whole-curved needles, two small retractors, twelve clip forceps, and a small toothed dissecting forceps. For intra-peritoneal shortening the instruments required are those given under the head of ventral or vaginal coeliotomy.

Operations.—Begin by placing the uterus in a normal position, as otherwise there will be subsequently too great a strain on the ligaments as they are drawn out. An incision from three to four inches in length is then made through the skin and fat. It begins just above the spine of the pubis, and runs upwards and outwards

parallel to Poupart's ligaments. This incision extends through the fat and the deep superficial fascia down to the aponeurosis of the external oblique muscle. If it is made in its correct position, the external abdominal ring will be found immediately under its lower and inner end. It will be recognised either by looking for the small boss of fat which bulges through it, or by laying the tip of the finger on the pubic spine, when the ring can be felt immediately above and

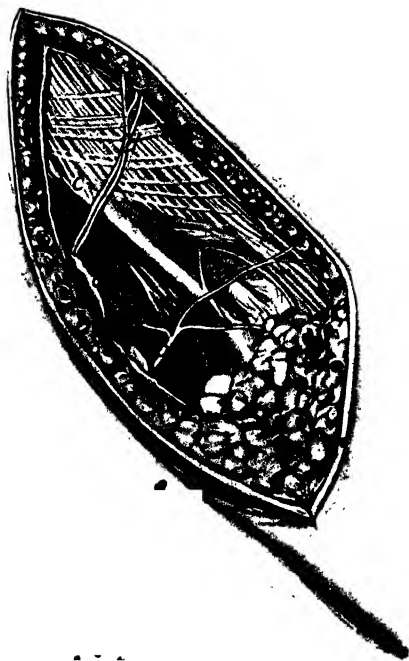


FIG. 311. The anatomical relations of the external abdominal ring and Poupart's ligament. *a*. Round ligament. *b*. Genital branch of genito-crural nerve. *c*. Poupart's ligament. *d*. Superficial epigastric artery. *e*. Superficial inguinal glands. (From a dissection by Dr. Cecil Smyly.)

slightly to the outer side. The edges of the ring may be then defined by a little dissection.

The round ligament must next be found, a proceeding which is sometimes attended with a little difficulty, owing to the manner in which the fibres of the ligament are spread out and mingled with the surrounding cellular tissue. It may be recognised by looking for a small nerve which also emerges through the ring—the genital branch

of the genito-crural nerve—directly under which it lies (*v.* Fig. 311), but the simplest method of finding it is to catch the small boss of fat already mentioned, and to draw it outwards, upwards, and slightly inwards. The fibres of the ligaments will then usually be seen on its under-surface, and may be recognised by the small blood-vessel running with them. If they are then caught and drawn gently down, a very little but careful dissection will enable a more tangible portion of the ligament to be reached. If the ligament cannot be found in this way, it is better to open up the inguinal canal for a short distance, as the ligament will then be readily found lying in it (*v.* Fig. 313). There

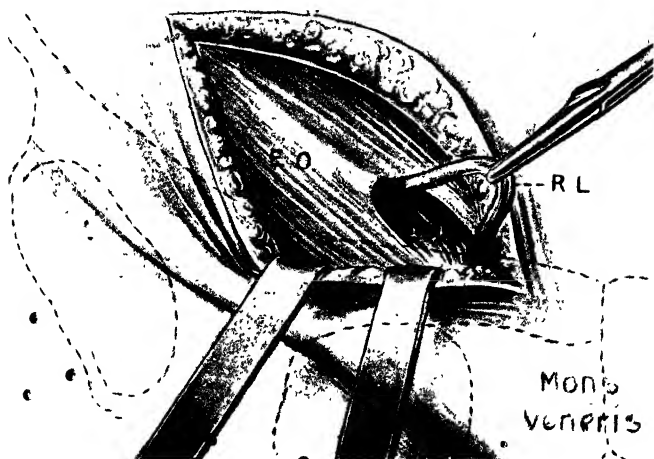


FIG. 312.—Extra-peritoneal shortening of the round ligaments. The ligament is exposed at the external abdominal ring, and drawn outwards with clip forceps. E.O. External oblique muscle. I.O. Internal oblique muscle. R.L. Round ligament.

is no objection to such a course, and indeed some operators open the whole length of the canal as a routine measure.

The ligament is then caught in a small clamp forceps, and drawn gently down. At first it appears covered by fascia, which must be cleared off it. A fresh grip is then taken of it with a second clamp, applied above the first, the fascia again cleared off, and this process continued until the pearly-white ligament appears. There is usually a little difficulty in drawing the ligaments down until the fascia is cleared off, but once this is done, it pulls easily out in some cases to the extent of several inches.

The next step consists in the fixing of the ligament in its new position.

This can be done by mattress sutures of catgut, so passed as to include both sides of the ring, or of the canal if the latter has been opened, and the ligament (v. Fig. 314, A). As many such sutures as are

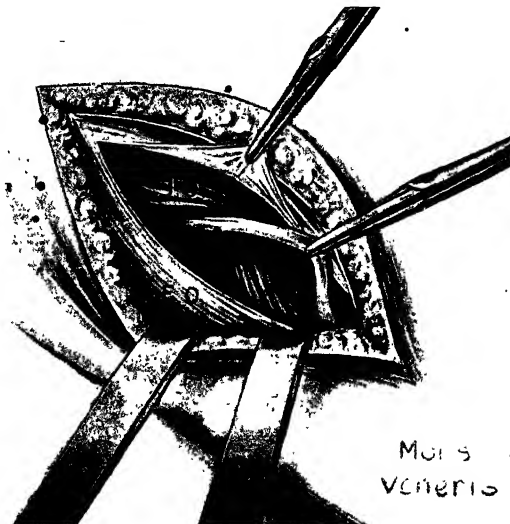


FIG. 313.—Extra-peritoneal shortening of the round ligaments. The inguinal canal has been opened and the ligament thus exposed. E.O. External oblique muscle. I.O. Internal oblique muscle.

required are introduced, care being taken that the assistant keeps the ligament drawn tightly downwards all the time, in order that it

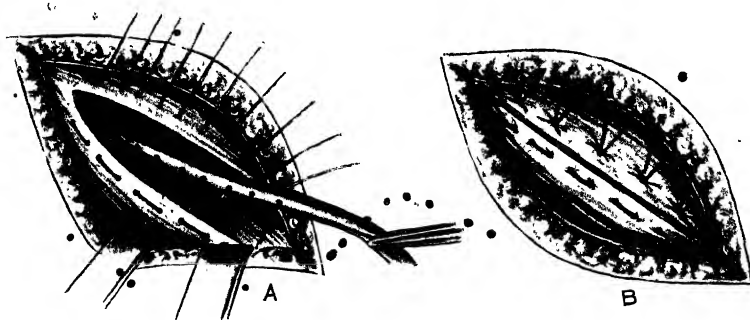


FIG. 314.—Extra-peritoneal shortening of the round ligaments. A. Method of closing the inguinal canal and fastening the ligament in its new position. B. The sutures tied.

may be transfixed by the sutures at a sufficiently high point. As soon as all the sutures are inserted and tied (v. Fig. 314, B), the projecting piece of ligament is cut off. A continuous catgut suture may be used instead of mattress sutures, and is more quickly

inserted and probably just as efficacious. A corresponding skin incision is then made at the opposite side, and the ligament is found and similarly treated.

The last step consists in closing the two incisions by means of a subcutaneous continuous suture of silkworm gut bringing together the fat and the deep superficial fascia, and a subcuticular suture bringing together the skin edges.



FIG. 315.—The modified Gilliam suspension operation. The loop of round ligament is drawn out through the belly of the rectus muscle.

After-treatment.—After extra-peritoneal shortening the patient is kept in bed for from ten to fourteen days, while the stitches in the abdominal wound are removed at the end of eight days.

SUSPENSION OF THE UTERUS BY THE ROUND LIGAMENTS.—Suspension of the uterus by the round ligaments can be carried out by the abdominal route.

Indications.—The indications are similar to those for shortening the round ligaments.

• *Instruments.*—The instruments required are the same as those required for ventral cœliotomy.

• *Operation.*—The peritoneal cavity is opened by the usual median vertical incision, and the uterus exposed. A forceps is pushed through the rectus muscle and peritoneum as near the lower angle of the

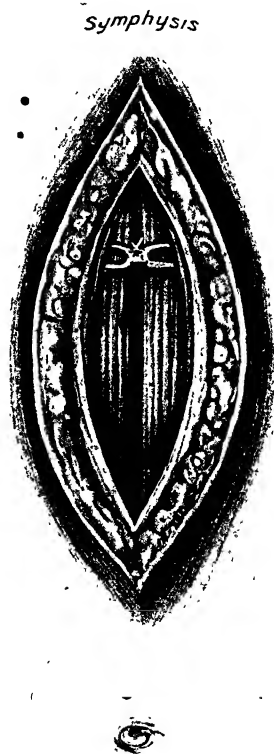


FIG. 316.—The modified Gilliam suspension operation. The loops of round ligaments sutured together over the recti muscles.

wound as possible. The round ligament is then picked up as it crosses the face of the broad ligament, keeping as close as one can to the uterus, provided that there is sufficient ligament to come evenly up into place without undue tension, and a loop is pulled out through the hole in the muscle and is sutured firmly to the overlying rectal fascia. The ligament on the opposite side is then treated in a similar manner. Lastly, the abdominal wound is closed in the usual manner.

• *After-treatment.*—The after-treatment is similar to that of ventral or vaginal cœliotomy, as the case may be.

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